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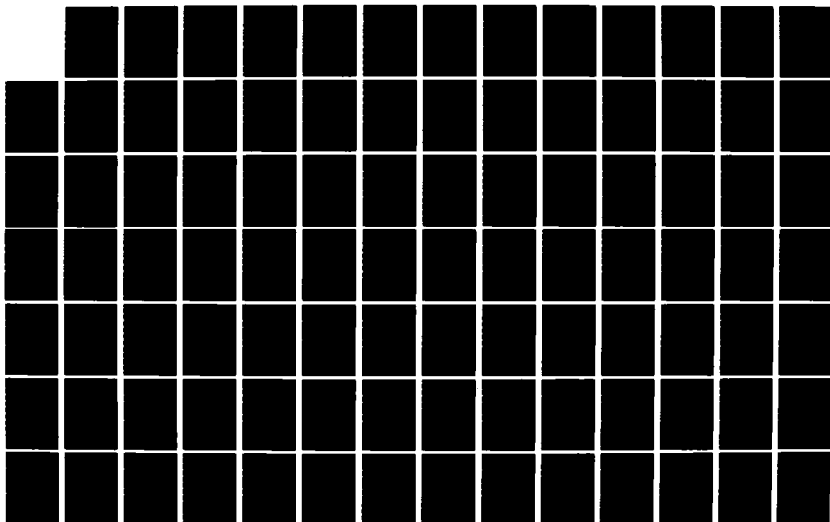
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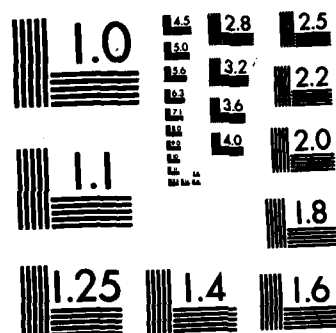
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AMMRC TR 81-38

SCATTERING MEASUREMENTS OF RAYTRAN ZINC
SELENIDE IN TRANSMISSION AT WAVELENGTHS
OF 0.6328, 3.39, AND 10.6 MICROMETERS

August 1981

F. O. BARTELL, A. G. DeBELL, E. L. DERENIAK,
J. HUBBS, T. STUHLINGER, and W. L. WOLFE
Optical Sciences Center
University of Arizona
Tucson, Arizona 85721

FINAL REPORT

Contract No. DAAG46-79-M-0871

Approved for public release; distribution unlimited.

Prepared for

ARMY MATERIALS AND MECHANICS RESEARCH CENTER
Watertown, Massachusetts 02172

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The transmission scattering of three samples of different thicknesses of zinc selenide were measured. The samples were 1/4", 3/4", and 1" thick. Fifty-four plots of the BTDF were made utilizing the scattering data obtained at 0.6328, 3.391, and 10.6 μ m. - 1/4 in, 3/4 in, and 1 in		

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FOREWORD

This report was prepared by Optical Sciences Center, University of Arizona, for the U. S. Army Materials and Mechanics Research Center under Contract DAAG46-79-M-0871, and covers work for the period from August 1979 to April 1981. J. A. Hofmann at AMMRC was the program technical monitor and W. L. Wolfe at the Optical Sciences Center was the principal investigator.

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SCATTERING MEASUREMENTS

Introduction

This document reports the scatter measurements made on vapor deposited "Raytran" zinc selenide material (manufactured by Raytheon) and a mirror surface at three wavelengths, 0.6328 μm , 3.39 μm , and 10.6 μm . The scattered radiation from the transmitted beam for a transparent window, such as zinc selenide, is the sum of contributions from three sources; which are the two polished surfaces and the scattering due to the bulk material. The bulk scattering results from bubbles, inclusions, striae and granularity within the body of the material. The surface scattering results from scratches or other surface imperfections which cause the surface to deviate from an ideal plane.

The scattering measurements of this report do not differentiate between the types of scattering but simply combine them into a single scatter value. The scattering from the mirror surface which is due to surface roughness or particles was similarly lumped into one parameter called BRDF.

Experimental Apparatus

The scattering experiment was performed on the scatter measurement instrument built and operated by the Optical Sciences Center at the University of Arizona. This device has a short optical bench that is capable of being rotated in a horizontal plane about a vertical axis. A gimbaled mount permits a sample to be centered on the optical-bench-rotational-axis and adjusted to various optional angles of incidence about both vertical and horizontal pivot axes. An adjacent platform supports a

laser and auxiliary optics so that a converging beam is incident on the sample. An appropriate detector is selected for the wavelength used and is mounted on the optical bench. The detector is aligned to face toward the sample and it detects the scattered radiation. The output signal of the detector is connected to a lock-in amplifier which derives its reference signal from a chopper installed in front of the laser. Baffles and apertures are used to block out stray radiation from the laser and off-angle reflections from the chopper blades. A schematic of the test setup is shown in Fig. 1.

Three laser sources were utilized for the scattering experiments: a 3 milliwatt helium-neon laser operating at 632.8 nanometers, a 4.5 milliwatt helium-neon laser operating at 3.391 micrometers, and a 3 watt carbon dioxide laser operating at 10.6 micrometers. In the case of the second laser, a long pass filter was mounted on the laser output to pass the 3.391 micrometer output but reject an undesired 1.15 micrometer output. For each laser, appropriate calibrated attenuators were placed in the beam to enable on-axis measurements. Each of the attenuators had a value between 10 and 20.

Three detectors were employed, one for each of the three lasers. A GaAsP photovoltaic detector with an operational amplifier used in the transimpedance configuration was utilized to detect the 632.8 nanometer radiation. A series of small apertures collinear with the detector limited the field of view to about 2 degrees. In order to be able to measure very low signals, provisions have been made for mounting a lens in front of the detector to increase the collecting numerical aperture. A lead sulfide photoconductive detector operating at dry ice temperature was utilized to detect the 3.391 micrometer radiation. The field of

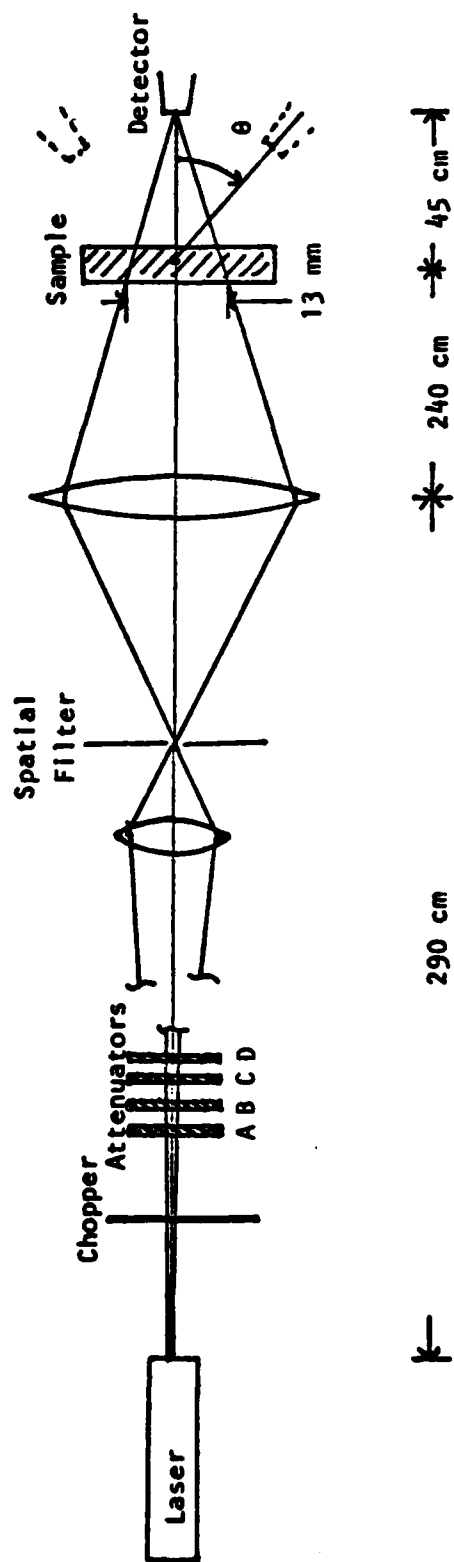


Figure 1. Optical Schematic of Scattering Instrument.

view of this detector was limited by a series of apertures similar to those used for the GaAsP detector, and again a lens attachment was provided. For the 10.6 micrometer band, a mercury-doped germanium photoconductor detector mounted in a liquid helium cooled dewar with a barium fluoride field lens was used.

All three laser-detector combinations were used with the lock-in amplifier, providing a dynamic range of 8 orders of magnitude. Noise fluctuations encountered at lower signal amplitudes were overcome by using longer integration times on the lock-in amplifier.

The angular position of the detector with respect to the sample was determined by a resolver with a digital angle readout. It is read within one minute of arc. The angular position of the sample in the horizontal plane was set with a smaller circular scale calibrated in one degree increments. The detectors were set to the appropriate height with a precision slide and lead screw after the laser was set to approximately the correct height.

Data Collection Procedure

The geometry of the measurement arrangement is shown in Fig. 2. The laser and detectors lie in the same horizontal plane. For zero degree incidence the sample is vertical and its surface is perpendicular to the direction of the laser beam. The incidence angle is changed by rotating the sample about the vertical axis through its front surface. The angle of measurement, the scatter angle, is determined by the position of the detector on a circle centered on the same vertical axis through the surface of the sample. The sample can also be tilted about a horizontal

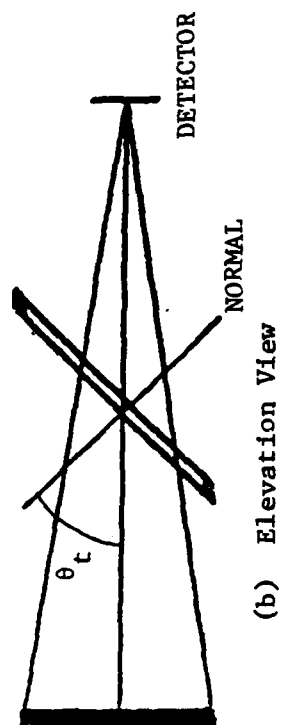
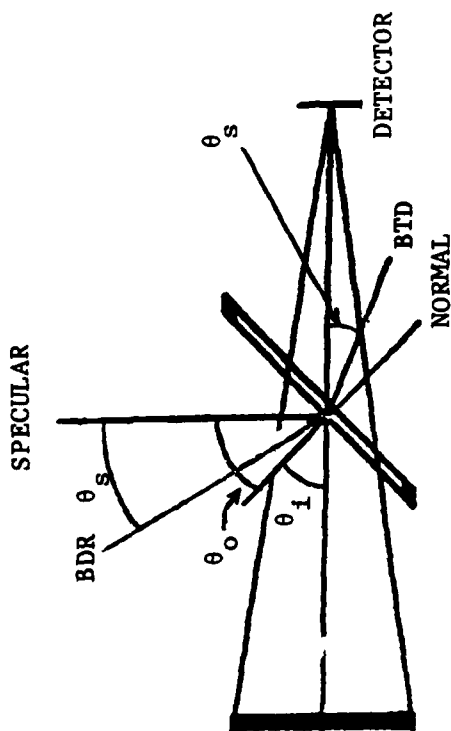


Fig. 2. Geometry of the scattering measurement. The angle θ_i is the angle of incidence; θ_o is that of specular reflection; θ_s , the scattering angle of measurement; θ_t is the tilt angle. Angles for both reflection and transmission are shown in (a).

axis through its front surface to obtain readings outside the plane of incidence.

The data taking procedure includes taking no-sample and sample runs. The former are done with everything in place except the sample so that the instrument background readings can be made. The procedure is identical for both types of run. The proper laser is chosen and aligned. The sample holder is set to the desired angles of incidence and tilt. All the attenuators are inserted and the detector is moved to an on-axis position by trial and error until its output is maximized. Then the reading is recorded, the angle recorders set to zero and a run started. The run consists of moving the detector to a series of positions at increasing angles from the on-axis position and removing attenuators as necessary. When the signals get low enough at the larger angles, a lens is inserted. It collected more flux over a large angle. Usually a run was terminated when the sample holder began to interfere with the measurements. Then attenuators were reinserted and the on-axis measurement repeated. Then a run was made with the detector moving in opposite direction and away from the axis. The on-axis measurement was again repeated. Then a new angle of incidence or tilt was chosen and the process was repeated.

Data Reduction

Two methods of data reduction are used, one for reflecting samples and one for transmitting samples. The methods are based on measured voltages and the definitions of BRDF and BTDF. When light is scattered from the sample the output voltage V is given in terms of the detector

responsivity $\mathcal{R}$, scattered radiance L , the sample area A_s and the solid angle the detector subtends at the sample Ω as

$$V = \mathcal{R} L A \Omega$$

The BRDF is defined¹ as the reflected radiance divided by the incident irradiance. The BTDF may be defined similarly with "transmitted" replacing "reflected." Our generalization uses "scattered" to mean either one. Then if E is the irradiance and ρ_s is the BSDF (Bidirectional Scattering Distribution Function)

$$V = \mathcal{R} \rho_s E A \Omega \cos \theta_s$$

By definition ρ_s for the no-sample measurement is 1 so that the voltage ratio of sample V_s to no-sample V_{ns} is

$$\frac{V_s}{V_{ns}} = \rho_s \Omega \cos \theta_s$$

The BSDF is then found to be

$$\rho_s = V_s / V_{ns} \Omega \cos \theta_s$$

Goldplated sandpaper has been found to be a reasonably good Lambertian reference if it is illuminated at angles of incidence less than 30° .²

So if the subscript sp is used to indicate a sandpaper measurement, the voltage ratio is

$$\frac{V_s}{V_{sp}} = \frac{\mathcal{R} \rho_s E A \Omega \cos \theta_s}{\mathcal{R} \rho_{sp} E A \Omega \cos \theta_{sp}}$$

If the sandpaper has a hemispherical reflectivity of 0.92 and calibration of the scatterometer is done at $\theta_{sp} = 0^\circ$ then

$$\rho_s = (V_s/V_{sp}) (0.92/\pi) (1/\cos\theta_s)$$

This is the basis of the sandpaper calibration, where ρ_s was determined independently.

Data Presentation

The data are presented in several ways. The abscissa is always a logarithmic scale. It is either the scattering angle θ_s or it is a quantity called B-BO (or $\beta-\beta_0$) where $B-BO = \sin\theta_s - \sin\theta_i$. There are theoretical reasons³ for plotting in this second coordinate system. The ordinate is always a logarithmic one and is either the BRDF or a slightly modified BTDF, one that is normalized to the on-axis value for the sample. If we did not use this normalization, thicker samples of the same material would have lower BTDF values just because their specular transmission would be lower.

The ordinates are labeled "BRDF" or "BTDF." The sample, wavelength and angle of incidence and tilt are listed on each graph and for the tabular listing following the graph. The angle of incidence is measured in the customary way, with respect to the surface normal. The scattering angle is however, referred to the direction of specular reflection. This provides a similar appearance for all the curves. The scattering angle can be positive or forward (further from the normal) of the specular direction or it can be negative or backward (between the normal and the

specular direction or even on the same side of the normal as the incident light).

The scatter plot is a convolution of the detector field of view of the laser beam profile and the scattered radiation. In fact, the scattered component can be obtained by subtracting the normalized no-sample data from the normalized sample data on a point-by-point basis. The accuracy of the resulting subtracted data is satisfactory at larger angles where the no-sample values are small. However at smaller angles where the data are comparable in size, the very small difference between two large numbers would yield considerable uncertainty. Deconvolution by subtraction was therefore not performed and the data taken at detector angles of less than two degrees contain a significant contribution from the beam profile.

The data at each of the three wavelengths were taken at six different input angles consisting of various combinations of two different incidence angles (θ_i) and three different tilt angles (θ_t). All combinations for which $\theta_i = 0^\circ$ and 15° and $\theta_t = 0^\circ$, 15° and 30° were measured, for three thicknesses of Raytran ZnSe samples, $1/4"$, $3/4"$, and $1"$.

The purpose of measuring the so-called "super" mirror was to demonstrate as closely as possible the quality of the unperturbed incident beam when the components of the instrument were arranged for measuring BRDF. After the measurements were completed we carefully examined the mirror under magnification and feel doubts that our so-called "super" mirror was really "super." The "no-sample" measurements are actually a better indication of the instrument function. They represent the

scattering of a plane parallel plate of air about as thick as each sample, as measured by the instrumentation.

Summary

Data are presented with an accuracy of about $\pm 20\%$ to a level of about 10^{-6} sr^{-1} . Improvements in instrumentation and software could make the measurements more standardized, the accuracy better and the minimum values lower. Some of the same improvements could be used to make the spectral selection more flexible.

The ZnSe data are presented in the following manner: For each of the three sample thicknesses, three wavelengths, two incident angles θ_i , and three tilt angles θ_t , a graph of BTDF versus scattering angle θ_s (both positive and negative) is given, followed by the corresponding data table(s). These add up to a total of fifty-four graphs. These graphs and corresponding data table(s) are given on pages 13-138.

The above parameters for each graph and table are denoted, for example, by "Sample - ZnSe 1/4 (0,15) 6328." This means: Sample thickness = 1/4." $\theta_i = 0$, $\theta_t = 15^\circ$, and $\lambda = 0.6328 \text{ }\mu\text{m}$.

Following the data for ZnSe are presented five graphs for the case of no sample: one graph for $0.6328 \text{ }\mu\text{m}$, one graph for $3.39 \text{ }\mu\text{m}$, and three graphs for $10.6 \text{ }\mu\text{m}$, where the last three graphs were taken on three different days. These five graphs are on pages 139-143.

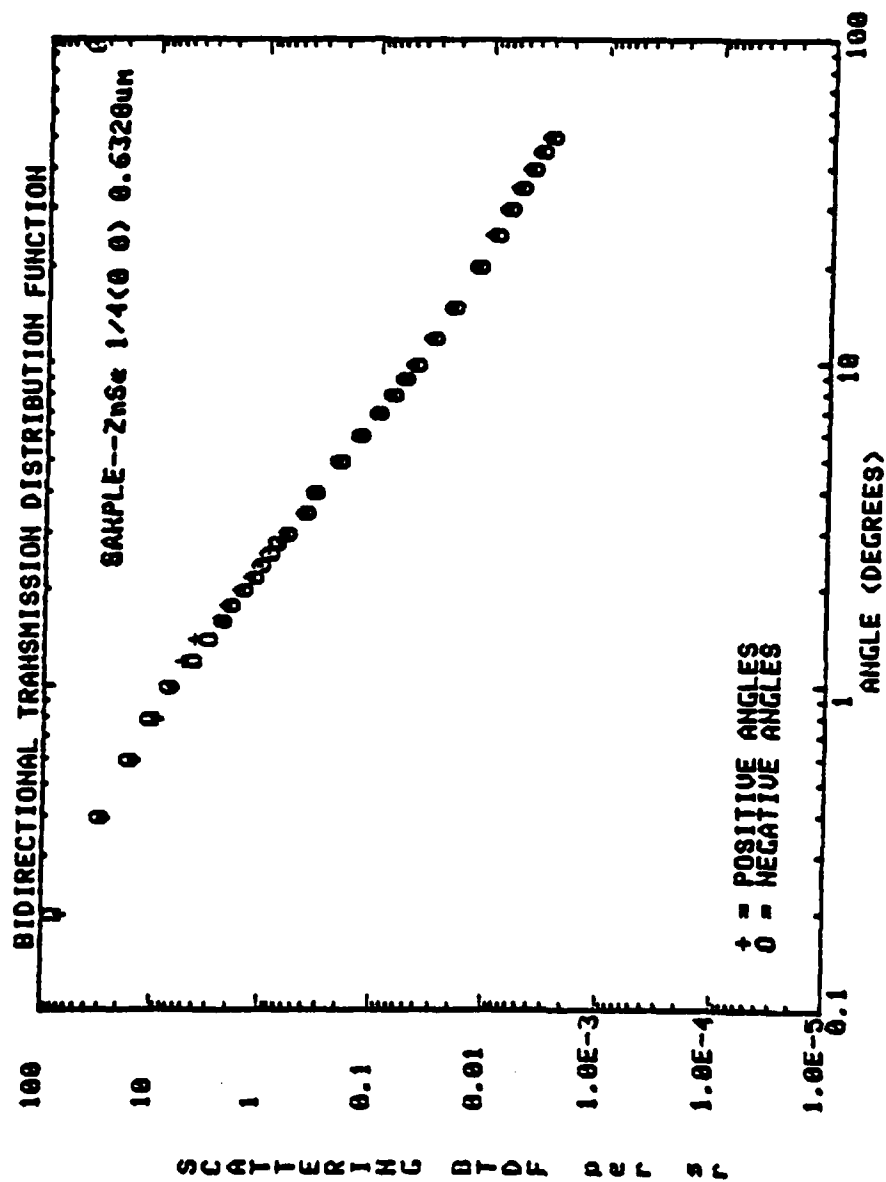
Lastly, the graphs and data tables for the "super mirrors" are presented on pages 144-157.

Acknowledgments

We appreciate the efforts of Larry Brooks in building the new goniometer on which the 10.6 μm measurements were made.

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1. F. E. Nicodemus and J. C. Richmond, Geometrical Considerations and Nomenclature for Reflectance, U. S. Department of Commerce, 1977.
2. T. W. Stuhlinger, Bidirectional Reflectance Distribution Function (BRDF) of Gold-plated Sandpaper, Optical Sciences Center, University of Arizona, Tucson, MS Thesis, 1981.
3. P. Beckmann and A. Spizzichino, Scattering of Waves from Rough Surfaces, Pergamon, 1963.



SAMPLE--ZnSe 1/4(0 0) 0.6328um

2/6/80

ANGLE
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3
3.5
4
5
6
7
8
9
10
12
15
20
25
30
35
40
45
50

BTDF DATA

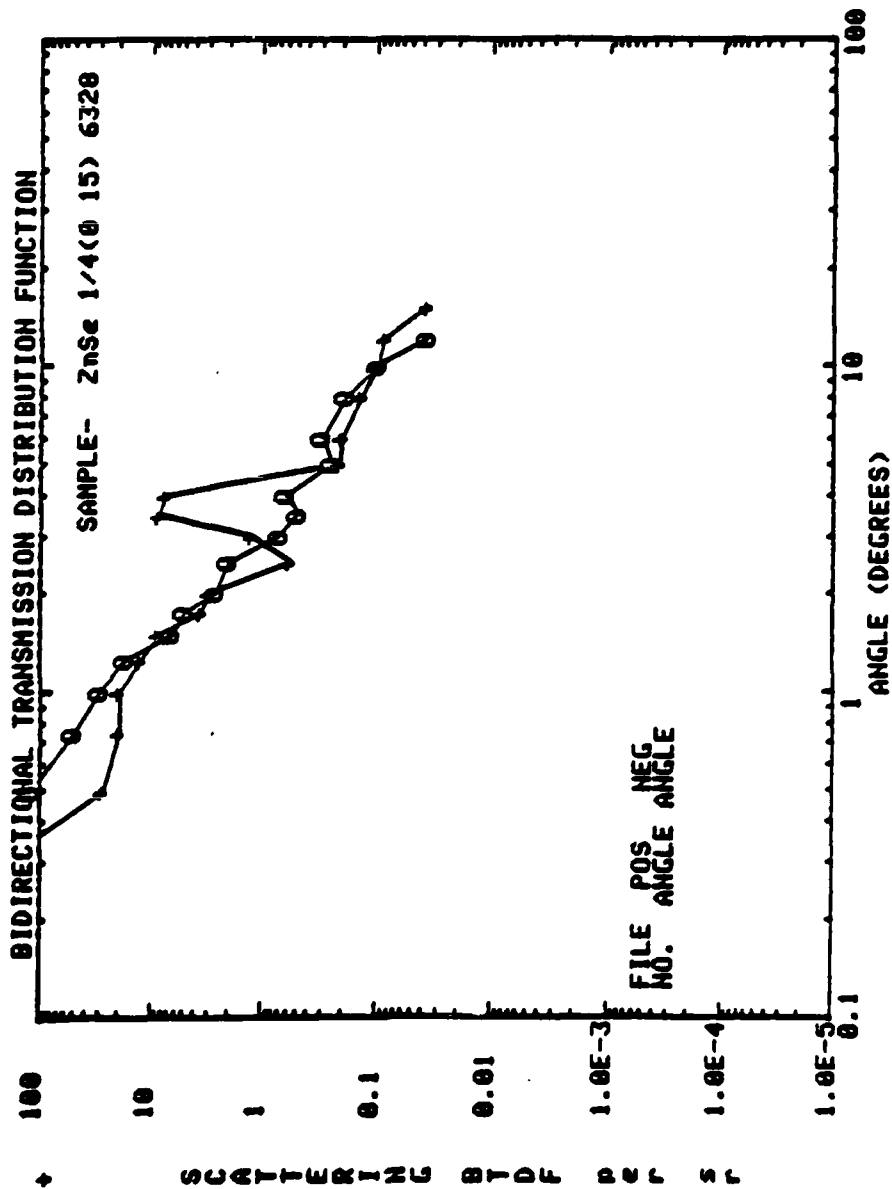
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1.27808292853
1.0904744718
0.91072210919
0.733637291386
0.612207703691
0.425003759209
0.346700693557
0.208620850768
0.13080058029
0.0975566215786
0.0735427351405
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0.0455271142296
0.0331295304702
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0.00313465605243

ANGLE

0
-0.2
-0.4
-0.6
-0.8
-1
-1.2
-1.4
-1.6
-1.8
-2
-2.2
-2.4
-2.6
-2.8
-3
-3.5
-4
-5
-6
-7
-8
-9
-10
-12
-15
-20
-25
-30
-35
-40
-45
-50

BTDF DATA

166666.666667
77.1082864897
29.0177828865
15.5306445059
10.2175294129
6.94792011684
4.65928911471
2.94709709959
2.25202709162
1.83498509551
1.44296560326
1.1454756295
0.978658832028
0.81099125737
0.705418466314
0.571053074892
0.398297582882
0.328829523786
0.197867198667
0.130962529264
0.0925279297447
0.0683283649023
0.0533815771837
0.0427052993927
0.030355658296
0.020237058041
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0.00871021007711
0.00676047662098
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SAMPLE - ZnSe 1/4(0 15).6328um

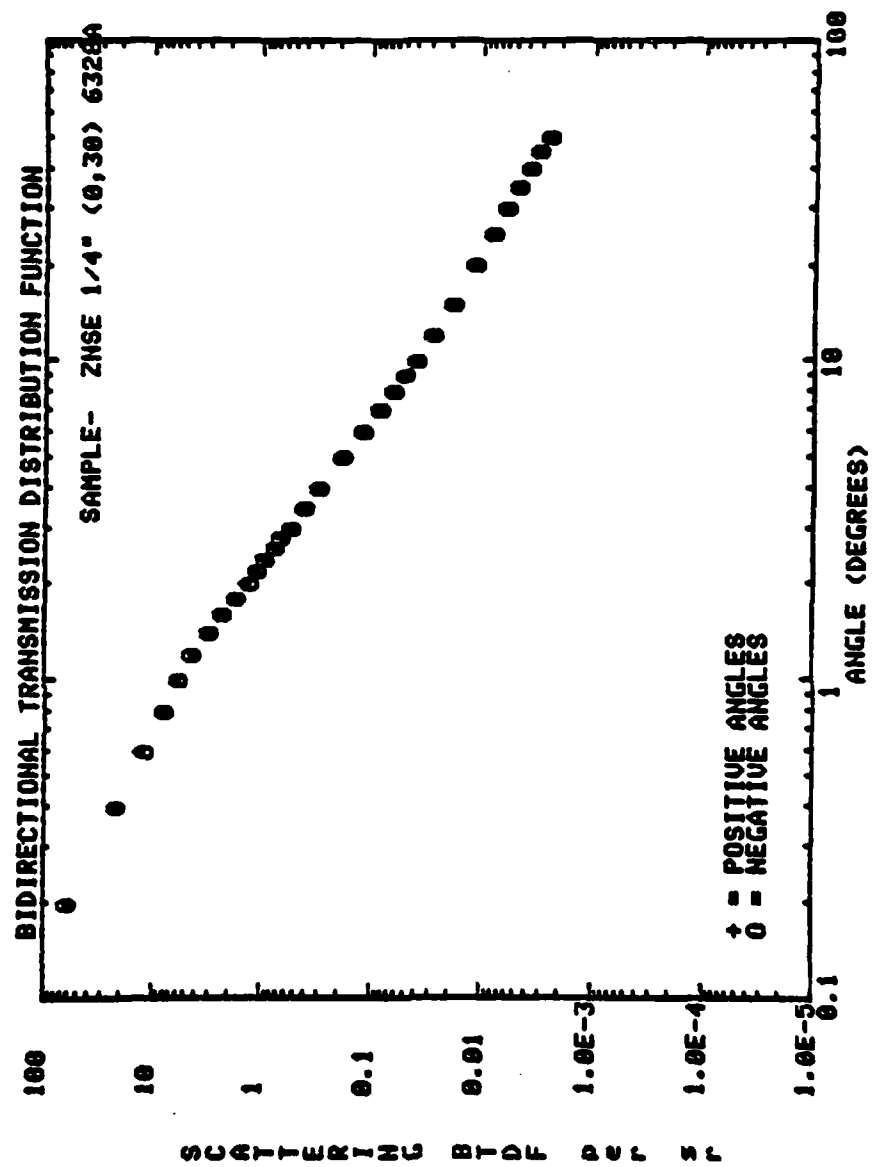
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0.5
0.75
1
1.25
1.5
1.75
2
2.5
3
3.5
4
5
6
8
10
12
15
-15
-12
-10
-8
-6
-5
-4
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-3
-2.5

BTDF DATA
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1.2387648934
0.67135556134
7.4325917743
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0.198202631231
0.13626448599
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0.0371631795714
0.0991016098815
0.185815208169
0.297303946846
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0.495506032076
0.718483638173
1.982023357656

SAMPLE - ZnSe 1/4 (0 15) .6328 μ m

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-1.5
-1.25
-1
-0.75
-0.5
-0.25
0

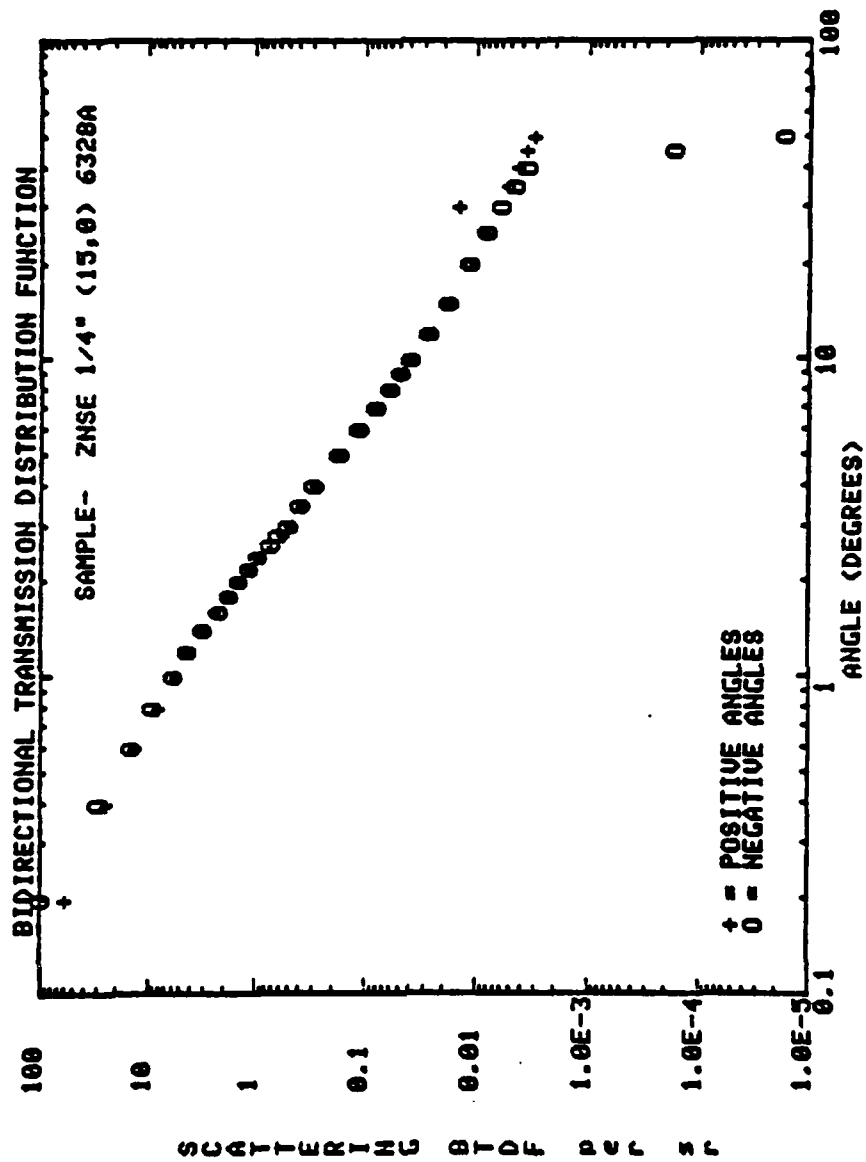
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718.483340244
845939.804822



SAMPLE-ZNSE 1/4" I-0 T-30 6328A 2/11/80

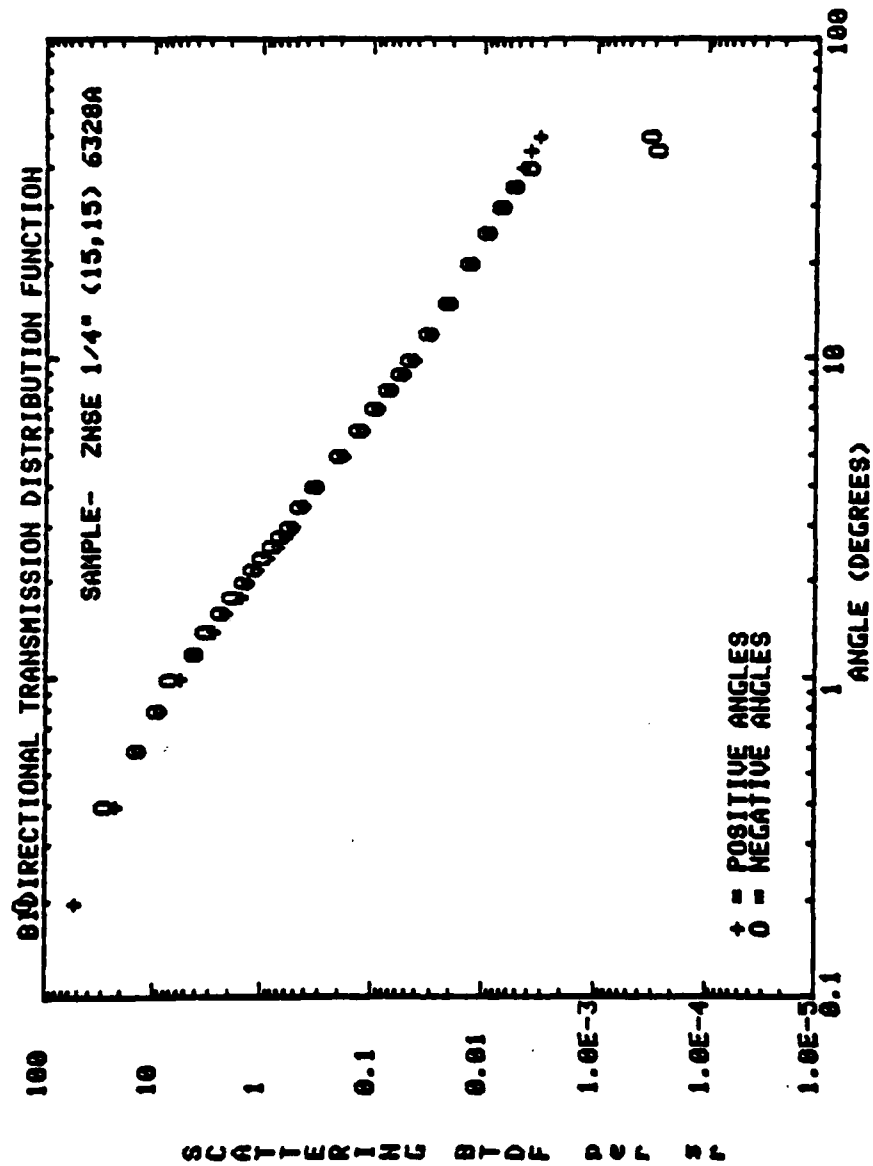
ANGLE

ANGLE	BTDF DATA
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0.4	21.5736042211
0.6	12.5606319075
0.8	8.1934576601
1	5.78482824358
1.2	3.02916347071
1.4	2.67625517851
1.6	2.16159078127
1.8	1.66102675843
2	1.33107751719
2.2	1.09419086305
2.4	0.854484153903
2.6	0.714326225167
2.8	0.599266597449
3	0.508178441187
3.2	0.396345402928
3.4	0.29094212235
3.6	0.174789734512
3.8	0.115510627224
4	0.0860574878257
4.2	0.0606459781606
4.4	0.0476172122255
4.6	0.0383109504485
4.8	0.0266781252191
5	0.0176820796773
5.2	0.0110281234449
5.4	0.00761584407628
5.6	0.00572358924804
5.8	0.00448277028689
6	0.00361419948113
6.2	0.00297828319439
6.4	0.00240439619512



SAMPLE-ZNSE 1/4" INC-15,TILT=0 6328A 2/11/80

ANGLE	BTDF DATA	ANGLE	BTDF DATA
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0.4	23.5084542808	-0.4	27.9759761837
0.6	12.5241547986	-0.6	14.0900903254
0.8	7.77657027922	-0.8	8.84954981232
1	5.59118383429	-1	5.65976002235
1.2	3.91666692834	-1.2	4.12132159667
1.4	2.79559204166	-1.4	2.9357360027
1.6	2.29891331653	-1.6	2.11711736057
1.8	1.64613551315	-1.8	1.67957983206
2	1.446256333765	-2	1.36636661994
2.2	1.12620798237	-2.2	1.141143643
2.4	0.91485531695	-2.4	0.921922168297
2.6	0.641606481424	-2.6	0.709609832169
2.8	0.536949471402	-2.8	0.602402621523
3	0.45682386225	-3	0.49519540197
3.5	0.355555757636	-3.5	0.375920141587
4	0.26202918002	-4	0.279663270221
5	0.159227237027	-5	0.167591785981
6	0.108212741129	-6	0.111471657657
7	0.0749760156609	-7	0.0791833631984
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9	0.0453353153006	-9	0.0470722409726
10	0.0368661130725	-10	0.0379881642373
12	0.0260720340906	-12	0.0264266029826
15	0.0174367762264	-15	0.0175076962713
20	0.0111596273935	-20	0.0111158219063
25	0.00833659439564	-25	0.00779602185929
30	0.01300039509	-30	0.00573147055456
35	0.00503198088673	-35	0.0041016055804
40	0.00410205571350	-40	0.00341917273266
45	0.00345443082455	-45	1.651866839E-4
50	0.00292304435054	-50	1.651843245E-5



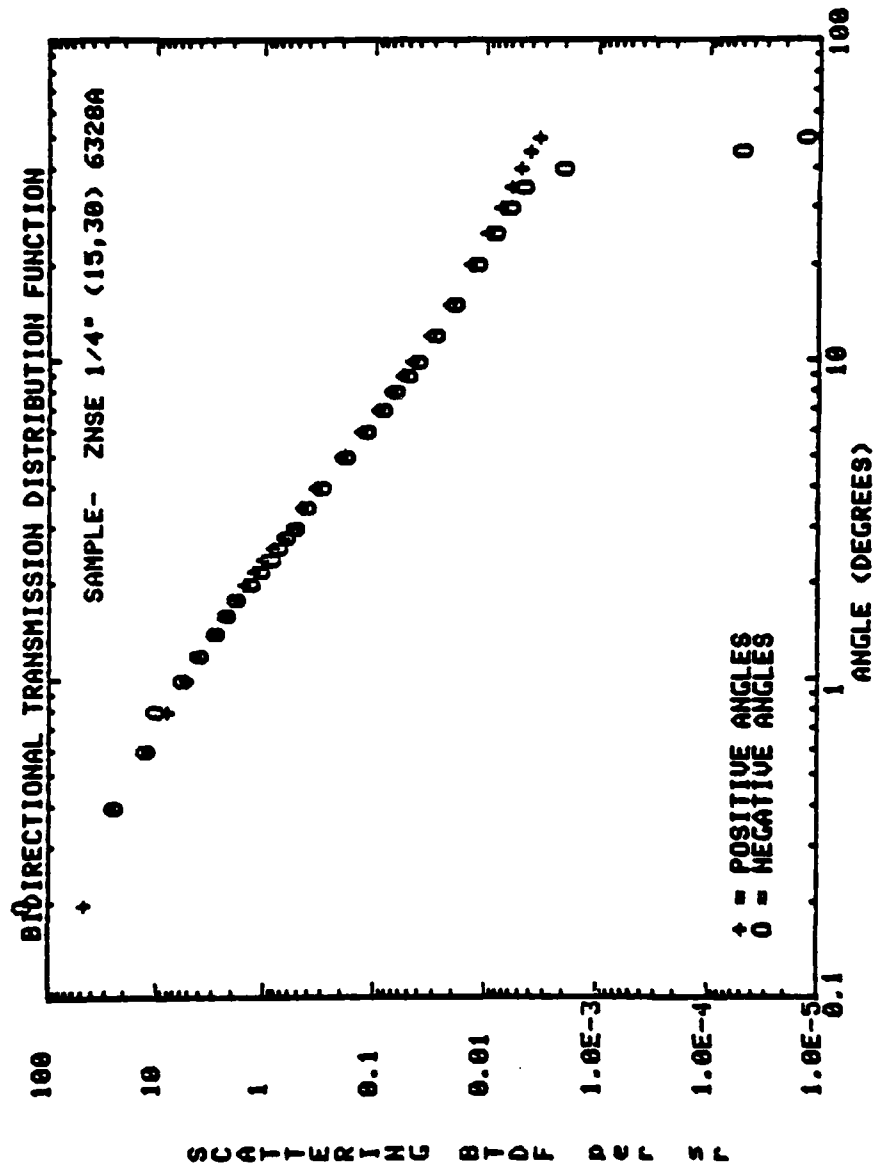
SAMPLE-ZNSE 1/4" INC-15, TILT-15 6320 A 2/11/80

ANGLE
0 0.2 0.4 0.6 0.8 1 1.2 1.4 1.6 1.8 2 2.2 2.4 2.6 2.8 3 3.5 4 5 6 7 8 9 10 12 15 20 25 30 35 40 45 50

BTDF DATA
166666.666667
50.6300115487
21.4203896206
12.5601376668
0.08906095039
5.27605980951
4.22623166830
2.61111134856
2.04581925788
1.48052714123
1.27720527712
1.65097389007
0.839060934426
0.696162875845
0.579324300256
0.4868272365
0.390744781072
0.302772275159
0.175212116172
0.117256874037
0.0835740731586
0.065363882510
0.050860988797
0.0406359273655
0.0289807205389
0.019530558978
0.0121594467354
0.00871016093302
0.00669415122778
0.00533965055499
0.00441040737805
0.0037174168351
0.0031109184565

ANGLE
0 -0.2 -0.4 -0.6 -0.8 -1 -1.2 -1.4 -1.6 -1.8 -2 -2.2 -2.4 -2.6 -2.8 -3 -3.5 -4 -5 -6 -7 -8 -9 -10 -12 -15 -20 -25 -30 -35 -40 -45 -50

BTDF DATA
166666.666667
147.962963238
27.2839508198
13.6419755365
8.04876569485
6.89043241845
4.03271631881
3.26586446906
2.30648175543
1.79876570249
1.39814840762
1.15432124686
0.962963220306
0.78703728388
0.64537060512
0.54043232443
0.432197776584
0.316839741374
0.191216098327
0.127216089016
0.093234779861
0.0697687256853
0.0544909455212
0.044136072419
0.03039552681397
0.0265403378785
0.0128944983736
0.0090311260757
0.00675545496209
0.00517776341099
0.0038197279924
2.71630158E-4
3.08677701E-4



SAMPLE-ZNSE 1/4° INC=15, TILT=30 6328A 2/11/80

ANGLE
0 0.2 0.4 0.6 0.8 1 1.2 1.4 1.6 1.8 2 2.2 2.4 2.6 2.8 3 3.5 4 5 6 7 8 9 10 12 15 20 25 30 35 40 45 50

BTDF DATA

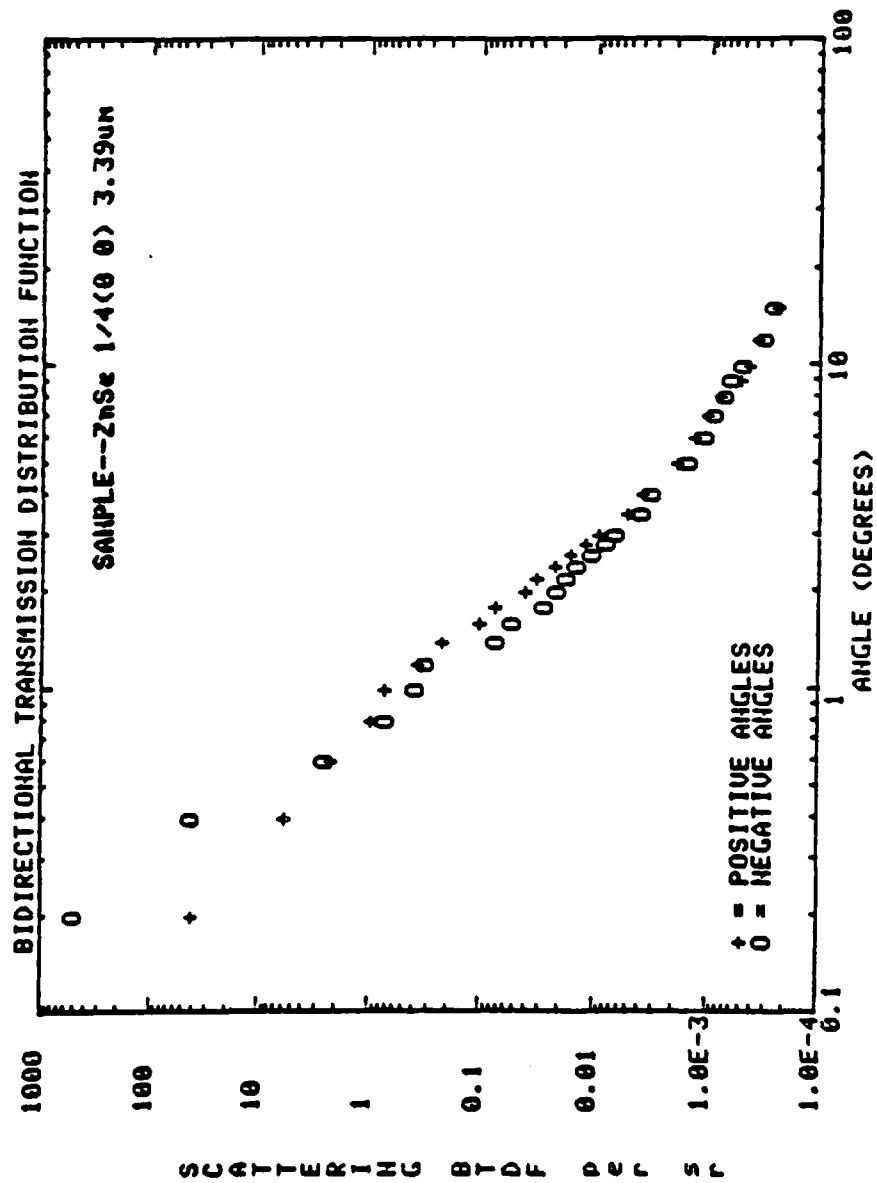
166666.666667
44.8484849317
25.3535355417
11.4141416048
7.48425453002
4.90484871612
4.06328012887
2.69489032231
2.15032705279
1.68954273764
1.45870496471
1.17944173841
0.974450646628
0.80303055489
0.636363867837
0.530303251738
0.428948550388
0.323993110386
0.191657976314
0.127772049419
0.0985652562595
0.0702616465389
0.6550655664171
0.0444446506492
0.0307191594831
0.0205084502181
0.0131701790566
0.03921595351217
0.0070754588416
0.0056375753103
0.00467354954364
0.0030392542651
0.00323566941477

ANGLE

0 -0.2 -0.4 -0.6 -0.8 -1 -1.2 -1.4 -1.6 -1.8 -2 -2.2 -2.4 -2.6 -2.8 -3 -3.5 -4 -5 -6 -7 -8 -9 -10 -12 -15 -20 -25 -30 -35 -40 -45 -50

BTDF DATA

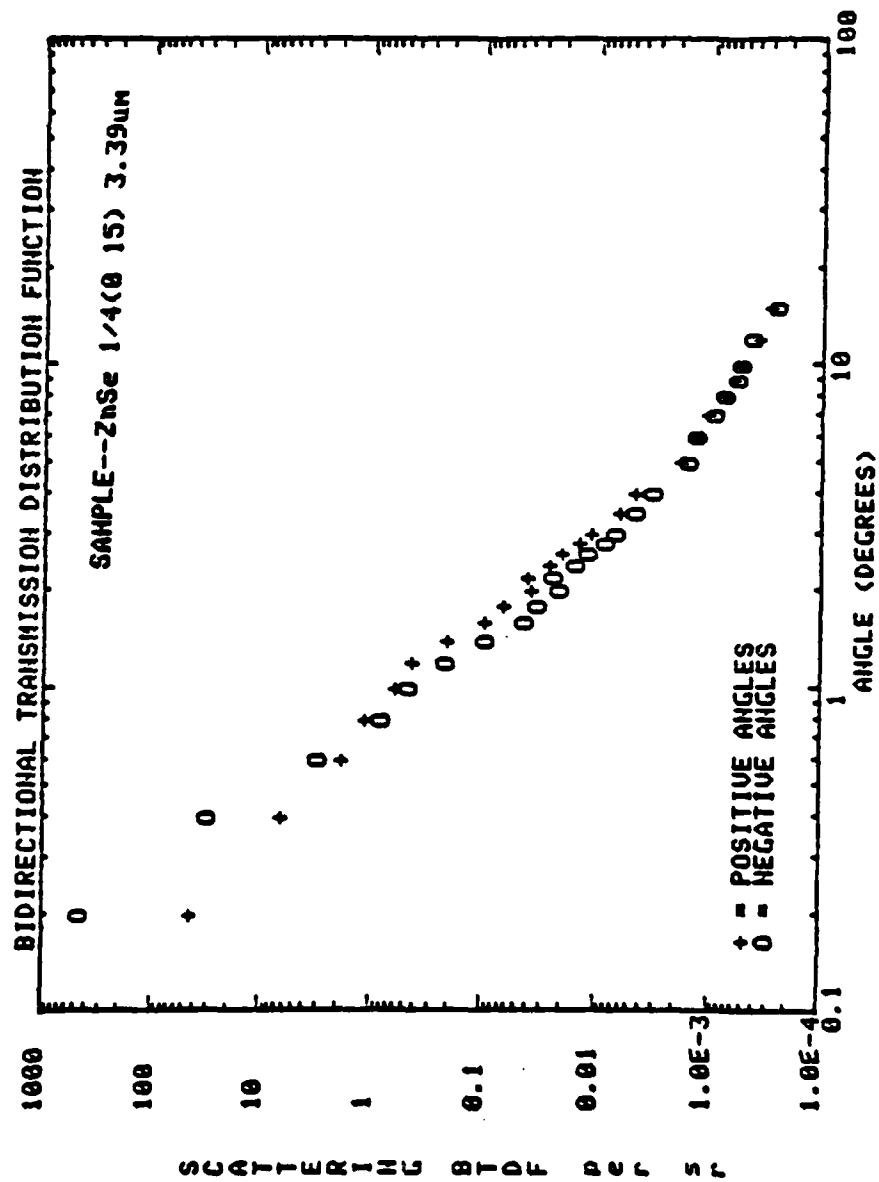
166666.666667
163.040935975
24.1578949162
12.1286551733
9.06725175498
5.46087744356
3.79298270955
2.72165287902
2.13011721207
1.74532185979
1.26900208346
1.04093598626
0.815789691696
0.715789698182
0.59649144504
0.497076230952
0.352228294803
0.284444655597
0.174409559822
0.115275046339
0.0823393684767
0.0635235804357
0.0493715305706
0.0402048640965
0.0275001037287
0.010333524718
0.0114183405599
0.0679125101431
0.06577363289672
0.00435843404363
0.00191380476251
4.025014715E-5
1.286698949E-5



SAMPLE--ZnSe 1/4(0 0) 3.39um

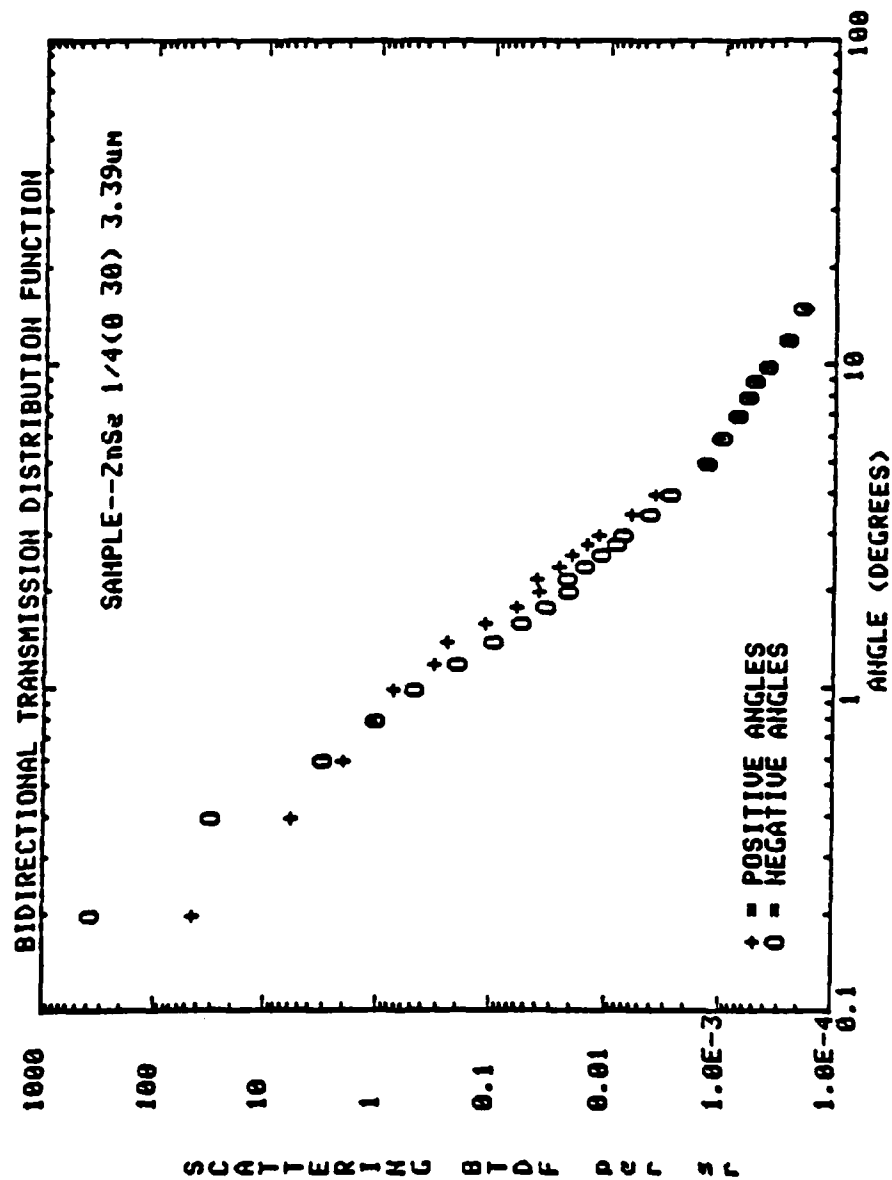
ANGLE	BTDF DATA	ANGLE	BTDF DATA
0	100084.692454	0	93829.3991756
0.2	39.325680054	-0.2	486.132342795
0.4	5.4386578793	-0.4	40.1623966509
0.6	2.09179149223	-0.6	2.42647813099
0.8	0.920388256532	-0.8	0.70284194139
1	0.70284194139	-1	0.376522468602
1.2	0.351420970695	-1.2	0.30958514085
1.4	0.217546315132	-1.4	0.0711209107359
1.6	0.100405991627	-1.6	0.0510397124105
1.8	0.0719576273328	-1.8	0.0267749311006
2	0.0384889634571	-2	0.0209179149223
2.2	0.0307911707657	-2.2	0.0173200335557
2.4	0.0211689299014	-2.4	0.0138560268445
2.6	0.0157804750174	-2.6	0.0101995753161
2.8	0.0115466890371	-2.8	0.00769779269141
3	0.00885246159513	-3	0.00635067897042
3.5	0.00500356524942	-3.5	0.003384889634571
4	0.00365645152842	-4	0.00307911707657
5	0.00178973680075	-5	0.00146258061137
6	0.00127013579408	-6	0.00103920201334
7	9.814685662E-4	-7	8.660016778E-4
8	7.697792691E-4	-8	7.12045824E-4
9	5.003565249E-4	-9	6.158234153E-4
10	4.23378599E-4	-10	4.811120432E-4
12	3.464006711E-4	-12	3.079117077E-4
15	2.309337807E-4	-15	2.501782625E-4

COPY? (Y or N) Y



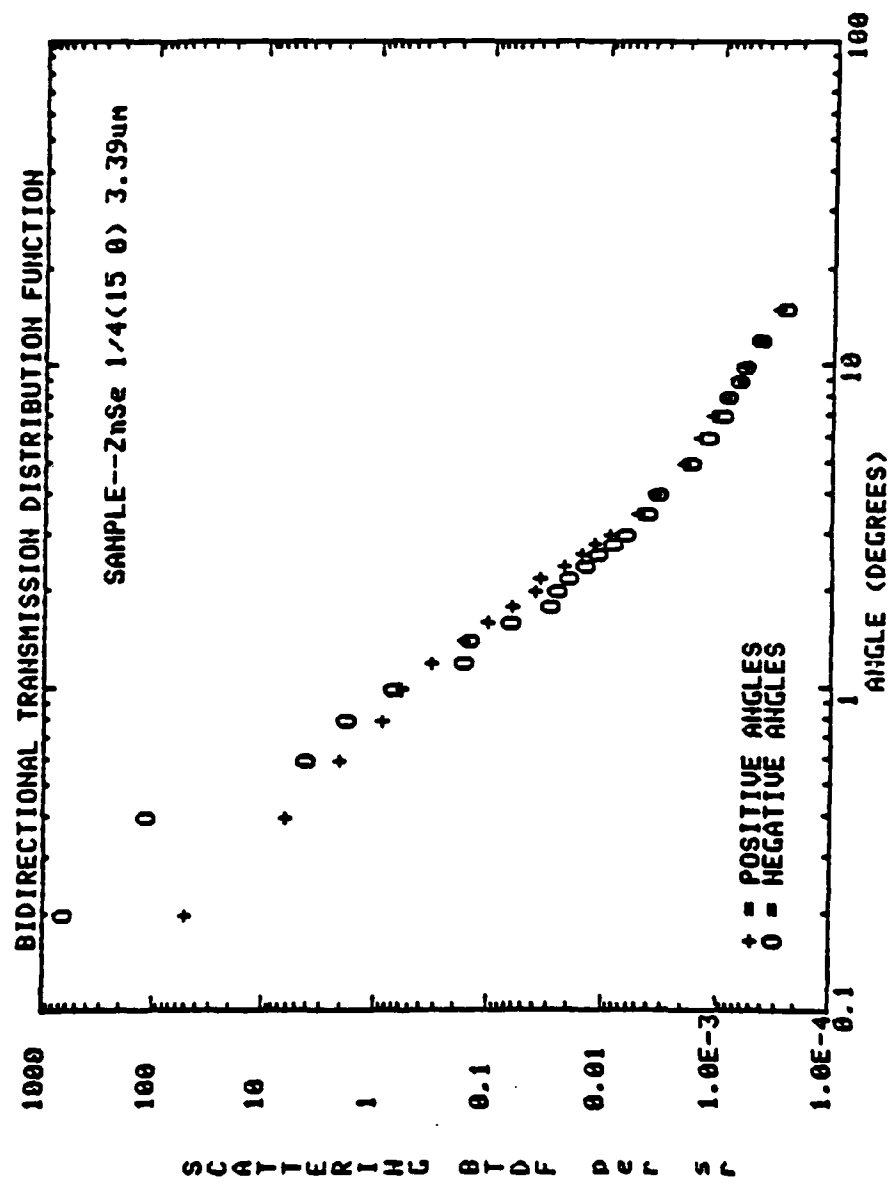
SAMPLE--ZnSe 1/4(0 15) 3.39um

ANGLE	BTDF DATA	ANGLE	BTDF DATA
0	95914.496935	0	97999.5946945
0.2	41.8358298446	-0.2	443.911623316
0.4	6.19170281701	-0.4	29.2850808913
0.6	1.75710485348	-0.6	2.84483642944
0.8	1.08773157596	-0.8	0.786513601079
1	0.577334451856	-1	0.443459796353
1.2	0.418358298446	-1.2	0.209179149223
1.4	0.200811983254	-1.4	0.0920388256582
1.6	0.0920388256582	-1.6	0.0418358298446
1.8	0.0635904613639	-1.8	0.0326319472788
2	0.0359780136664	-2	0.0209179149223
2.2	0.0384689634571	-2.2	0.0230933780742
2.4	0.0250178262471	-2.4	0.0230933780742
2.6	0.0192444817285	-2.6	0.0150106957483
2.8	0.01347113721	-2.8	0.0115466890371
3	0.010776909768	-3	0.00808268232599
3.5	0.00596578933585	-3.5	0.0065431237877
4	0.00442623079756	-4	0.00442623079756
5	0.00177049231903	-5	0.00307911707657
6	0.00132786923927	-6	0.00153955853828
7	0.00100071304988	-7	0.00128933027581
8	7.312903057E-4	-8	9.044906412E-4
9	6.158234153E-4	-9	7.505347874E-4
10	5.196010067E-4	-10	5.773344519E-4
12	3.656451528E-4	-12	5.388454884E-4
15	2.886672259E-4	-15	4.23378598E-4
			2.501782625E-4



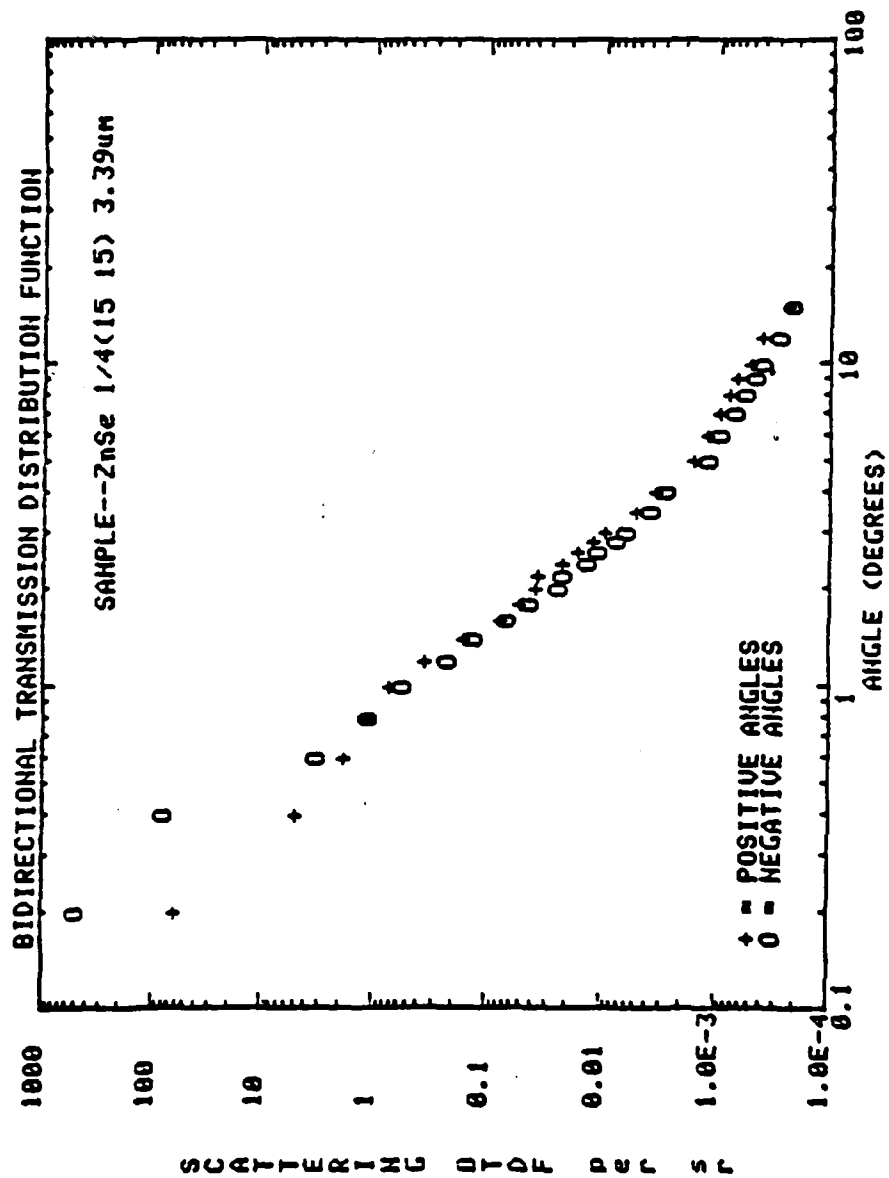
SAMPLE--ZnSe 1/4 (0,30) 3.39um

ANGLE	BTDF DATA	ANGLE	BTDF DATA
0	95914.496935	0	102169.790213
0.2	41.8358298446	-0.2	357.294721205
0.4	5.68967285887	-0.4	29.2850808913
0.6	1.92444817285	-0.6	2.92850808913
0.8	1.08773157596	-0.8	1.00405991627
1	0.70284194139	-1	0.451826962322
1.2	0.30958514085	-1.2	0.192444817285
1.4	0.23428064713	-1.4	0.0920308256582
1.6	0.108773157596	-1.6	0.0527131456043
1.8	0.0577334451856	-1.8	0.03263194722788
2	0.0368155302633	-2	0.0209179149223
2.2	0.0384889634571	-2.2	0.0211689299014
2.4	0.0250178262471	-2.4	0.014818250931
2.6	0.0192444817285	-2.6	0.010776909768
2.8	0.0142409164791	-2.8	0.0078902375087
3	0.0111617994026	-3	0.00692801342227
3.5	0.00577334451856	-3.5	0.00404134116299
4	0.00365645152842	-4	0.002694227442
5	0.00132786923927	-5	0.00128938027581
6	0.00101995753161	-6	9.622240364E-4
7	7.312903057E-4	-7	7.12045824E-4
8	5.773344519E-4	-8	5.773344519E-4
9	4.811120432E-4	-9	5.003565249E-4
10	4.041341163E-4	-10	3.848896346E-4
12	2.501782625E-4	-12	2.501782625E-4
15	1.7320033356E-4	-15	1.924448173E-4



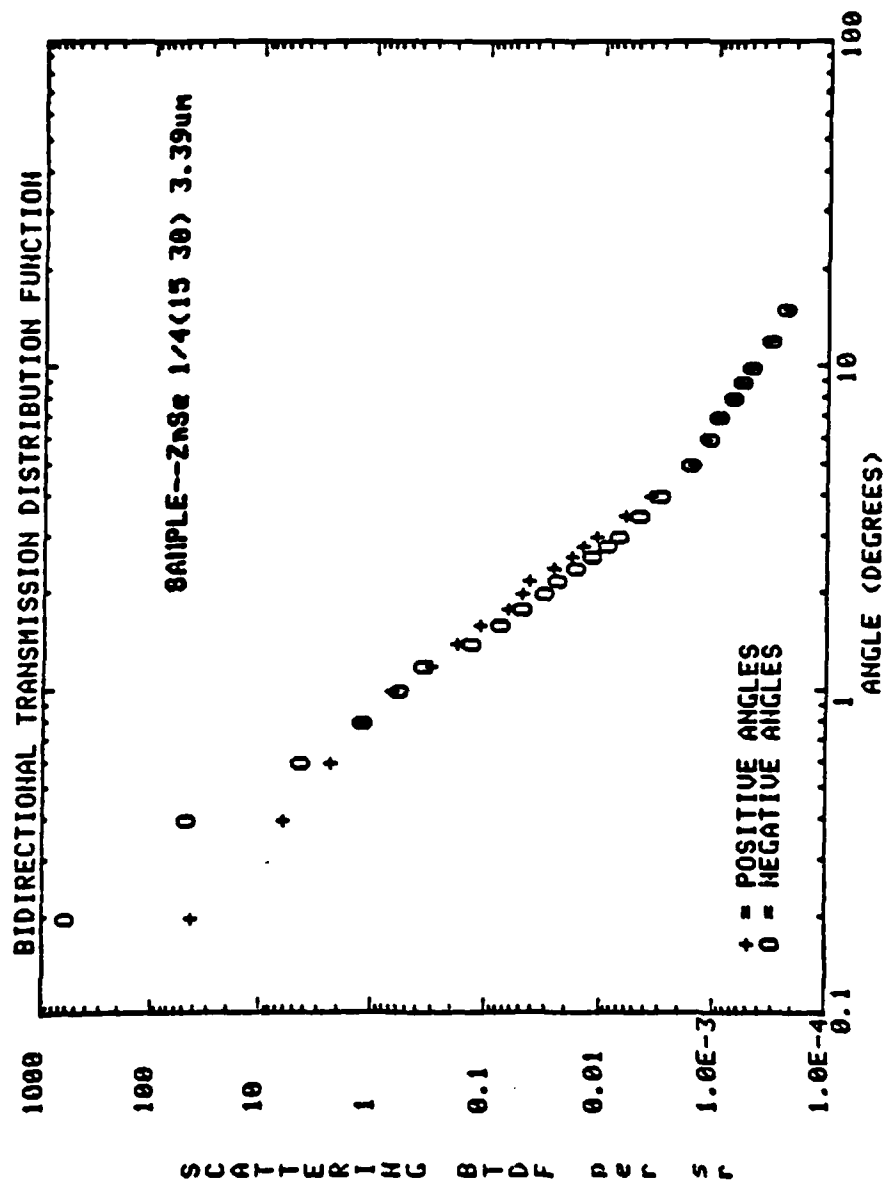
SAMPLE--ZnSe 1/4(15 0) 3.39um

ANGLE	BTDF DATA	ANGLE	BTDF DATA
0	85489.0081377	0	89659.2036367
0.2	48.194875981	-0.2	625.027297879
0.4	6.02435949763	-0.4	112.454710622
0.6	2.00811983254	-0.6	4.01623966509
0.8	0.836716596893	-0.8	1.75710485348
1	0.568967285887	-1	0.669373277514
1.2	0.30958514085	-1.2	0.15897615341
1.4	0.15897615341	-1.4	0.142241821472
1.6	0.100405991627	-1.6	0.062753744767
1.8	0.0610903115732	-1.8	0.0276116476975
2	0.0376522468602	-2	0.0242647813099
2.2	0.0346400671114	-2.2	0.0192444817285
2.4	0.0211689299014	-2.4	0.0138560268445
2.6	0.0150106957483	-2.6	0.010776909768
2.8	0.0115466890371	-2.8	0.0078902375087
3	0.00846757196056	-3	0.00615823415313
3.5	0.00481112043213	-3.5	0.00404134116299
4	0.00346400671114	-4	0.00327156189385
5	0.00192444817285	-5	0.00169351439211
6	0.00140404716618	-6	0.00119315786717
7	0.00111617994026	-7	9.044906412E-4
8	0.467571961E-4	-8	8.082682326E-4
9	6.35067897E-4	-9	6.35067897E-4
10	5.580899701E-4	-10	5.773344519E-4
12	4.641341163E-4	-12	4.23370598E-4
15	2.886672259E-4	-15	2.501782625E-4



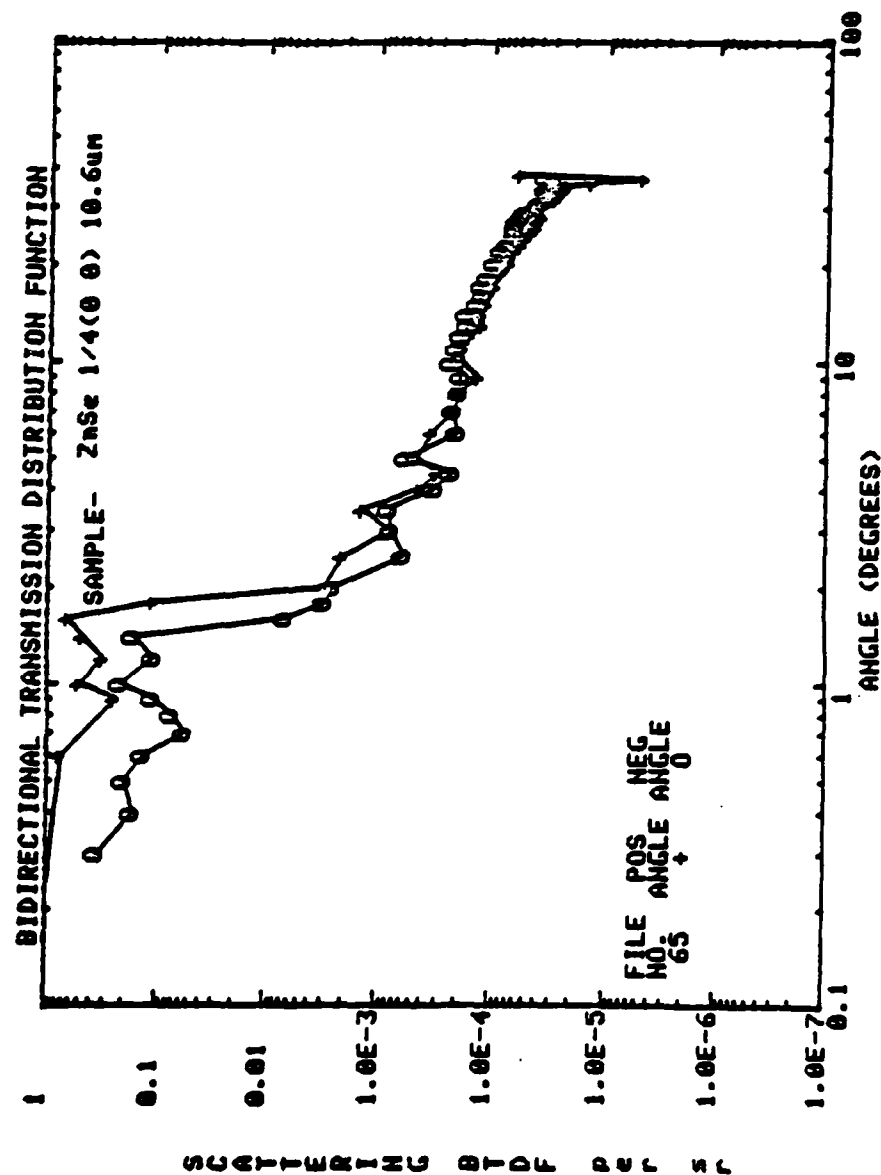
SAMPLE--ZnSe 1/4(15 15) 3.39um

ANGLE	BTDF DATA	ANGLE	BTDF DATA
0	93829.3991756	0	93829.3991756
0.2	58.9048484213	-0.2	476.392961607
0.4	4.6856129426	-0.4	77.6473001917
0.6	1.75710485348	-0.6	3.0958514085
0.8	1.08773157596	-0.8	1.08773157596
1	0.70284194139	-1	0.54386578798
1.2	0.334686638757	-1.2	0.217546315192
1.4	0.150608987441	-1.4	0.125507489534
1.6	0.0727943439297	-1.6	0.0652638945576
1.8	0.0502029558136	-1.8	0.0418258298446
2	0.0359788136664	-2	0.023428064713
2.2	0.0346400671114	-2.2	0.0211689299014
2.4	0.0211689299014	-2.4	0.0128938027581
2.6	0.0157804750174	-2.6	0.0103920201334
2.8	0.0115466890371	-2.8	0.00731290305684
3	0.00904490641241	-3	0.00596578933585
3.5	0.00481112043213	-3.5	0.00365645152842
4	0.00327156189385	-4	0.002694227442
5	0.00153955853828	-5	0.00115466890371
6	0.00115466890371	-6	9.23735123E-4
7	9.044906412E-4	-7	6.543123788E-4
8	7.312903057E-4	-8	5.388454884E-4
9	6.35667897E-4	-9	4.426230798E-4
10	4.811120432E-4	-10	3.848896346E-4
12	3.848896346E-4	-12	2.694227442E-4
15	2.369337807E-4	-15	2.11689299E-4



SAMPLE--ZnSe 1/4(15 30) 3.39um

ANGLE	BTDF DATA	ANGLE	BTDF DATA
0	97999.5946945	0	97999.5946945
0.2	40.1623966509	-0.2	590.303559108
0.4	5.94068783794	-0.4	45.517382871
0.6	2.17546315192	-0.6	4.09991132478
0.8	1.17140323565	-0.8	1.17140323565
1	0.635904613639	-1	0.560600119218
1.2	0.292850908913	-1.2	0.343053804726
1.4	0.175710485348	-1.4	0.133874655503
1.6	0.108773157596	-1.6	0.0736310605266
1.8	0.06619170281701	-1.8	0.046856129426
2	0.046856129426	-2	0.0301217974881
2.2	0.0404134116299	-2.2	0.0230933780742
2.4	0.0250178262471	-2.4	0.0159729198347
2.6	0.0173200335557	-2.6	0.0115466890371
2.8	0.0140484716618	-2.8	0.00346757196056
3	0.0103920201334	-3	0.00673556860499
3.5	0.00577334451856	-3.5	0.00442623079756
4	0.00346400671114	-4	0.00288667225928
5	0.00144333612964	-5	0.00157804750174
6	0.00115466890371	-6	0.0010776909768
7	9.044906412E-4	-7	8.852461535E-4
8	6.735568605E-4	-8	6.735568605E-4
9	5.773344519E-4	-9	5.580899701E-4
10	4.618675615E-4	-10	4.618675615E-4
12	3.271561894E-4	-12	3.079117077E-4
15	2.11689299E-4	-15	2.309337807E-4



SAMPLE - ZnSe 1/4 (0 0) 10.6um

ANGLE

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1 1.2 1.4 1.6 1.8 2 2.5 3 3.5 4 4.5 5 6 7 8 9 10 11 12 13

BIDF DATA

27397.260274
24993.669454
19204.2587329
521.14869563
25.6515484981
10.2371747523
0.756753816082
2.36256218723
1.41911729046
0.248972418423
0.515120625421
0.316401395854
0.48617155088
0.656808150813
0.113197093891
0.0030428612567
0.0020371919461
0.154678011E-4
0.001360959828
4.367998558E-4
3.053943282E-4
4.683034146E-4
3.481992781E-4
2.188249859E-4
2.018731148E-4
1.363910772E-4
1.853867508E-4
1.891836037E-4
1.617502333E-4
1.248029551E-4

ANGLE

14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 32 33 34 35 36 37 38 38 37 36 35 34 33 32 31

BIDF DATA

1.286884356E-4
1.1707694E-4
1.142997587E-4
9.886198222E-5
9.847803999E-5
8.534482653E-5
7.485822911E-5
7.333743472E-5
6.609571281E-5
5.832508248E-5
5.349727691E-5
4.679914367E-5
4.412821925E-5
4.198469858E-5
3.905965299E-5
4.162518111E-5
4.055642668E-5
2.970392708E-5
2.738897667E-5
2.550836298E-5
2.419948588E-5
1.425971961E-5
4.906412061E-6
6.024964966E-5
3.01279985E-5
3.653363949E-5
3.090968317E-5
2.561747698E-5
3.620191703E-5
3.590431605E-5
3.639619327E-5
4.042498915E-5

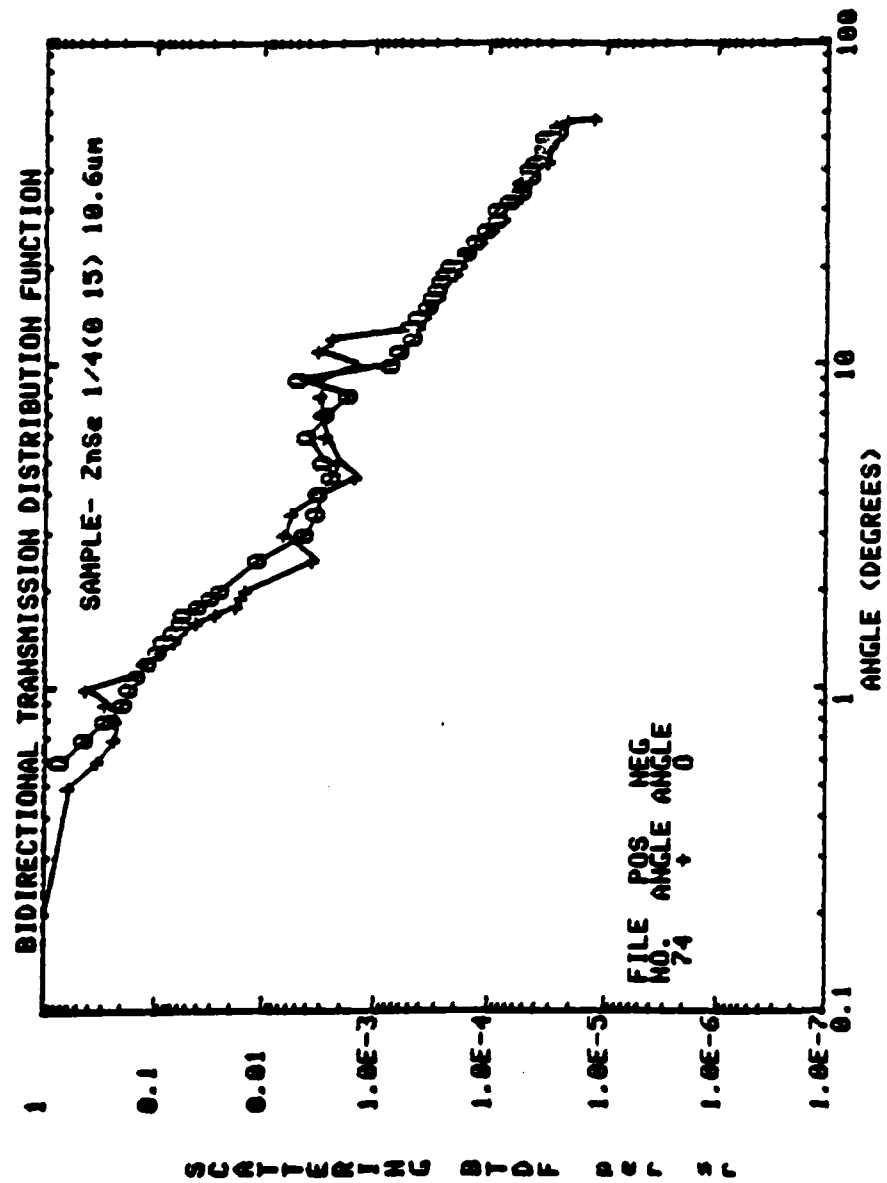
ZnSe 1/4 0 0 10.6 μ m

ANGLE
-1.6
-1.4
-1.2
-1.0
-0.8
-0.7
-0.6
-0.5
-0.4
-0.3
-0.2
-0.1
0

BTDF DATA
0.00682351559574
0.168111973675
0.11147460165
0.22053107561
0.113696478363
0.07497816197
0.0577174459989
0.136131291346
0.203590033593
0.165982658061
0.3527851526
9.25412975126
2205.58610331
24340.6941745

ANGLE
-30
-29
-28
-27
-26
-25
-24
-23
-22
-21
-20
-19
-18
-17
-16
-15
-14
-13
-12
-11
-10
-9
-8
-7
-6
-5
-4.5
-4
-3.5
-3
-2.5
-2
-1.8

BTDF DATA
4.353241622E-5
5.45884593E-5
5.938288394E-5
6.540097456E-5
6.676582784E-5
6.63935568E-5
6.188333429E-5
7.742779531E-5
8.588957236E-5
7.785325876E-5
9.869838833E-5
9.659077956E-5
1.143158286E-4
1.309352411E-4
1.269992969E-4
1.413645585E-4
1.727250032E-4
1.696656529E-4
1.968169129E-4
2.10980878E-4
2.344876268E-4
1.923131929E-4
2.014769813E-4
2.239774512E-4
2.039418867E-4
5.797109604E-4
2.320721733E-4
3.240243909E-4
8.027484859E-4
7.815939843E-4
6.047558884E-4
0.00252197725733
0.00296653210818



SAMPLE - ZnSe 1/4(0 15) 10.6um

ANGLE
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1.1
1.2
1.3
1.4
1.5
1.6
1.7
1.8
1.9
2
2.5
3
3.5
4
4.5
5
6
7
8

BTDF DATA
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ANGLE
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56
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-54

BTDF DATA
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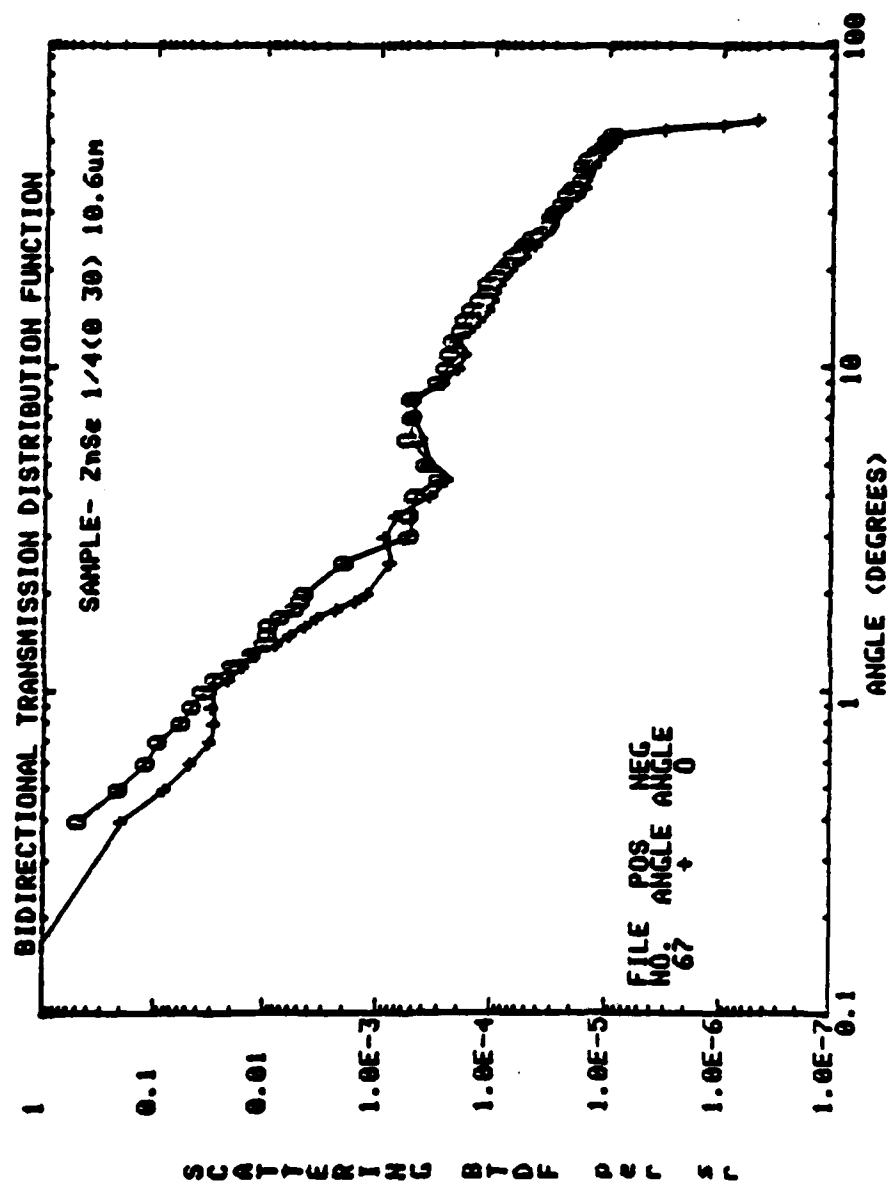
SAMPLE - ZnSe 1/4 (0 15) 10.6 μ m

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-32
-30
-28
-26
-24
-22
-20
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-9
-8
-7
-6
-5
-4.5

BTDF DATA
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ANGLE
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-2
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-1.8
-1.7
-1.6
-1.5
-1.4
-1.3
-1.2
-1.1
-1
-0.9
-0.8
-0.7
-0.6
-0.5
-0.4
-0.3
-0.2
-0.1
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SAMPLE - ZnSe 1/4(0 30) 10.6um

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0.7
0.8
0.9
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1.2
1.3
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ANGLE
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BTDF DATA
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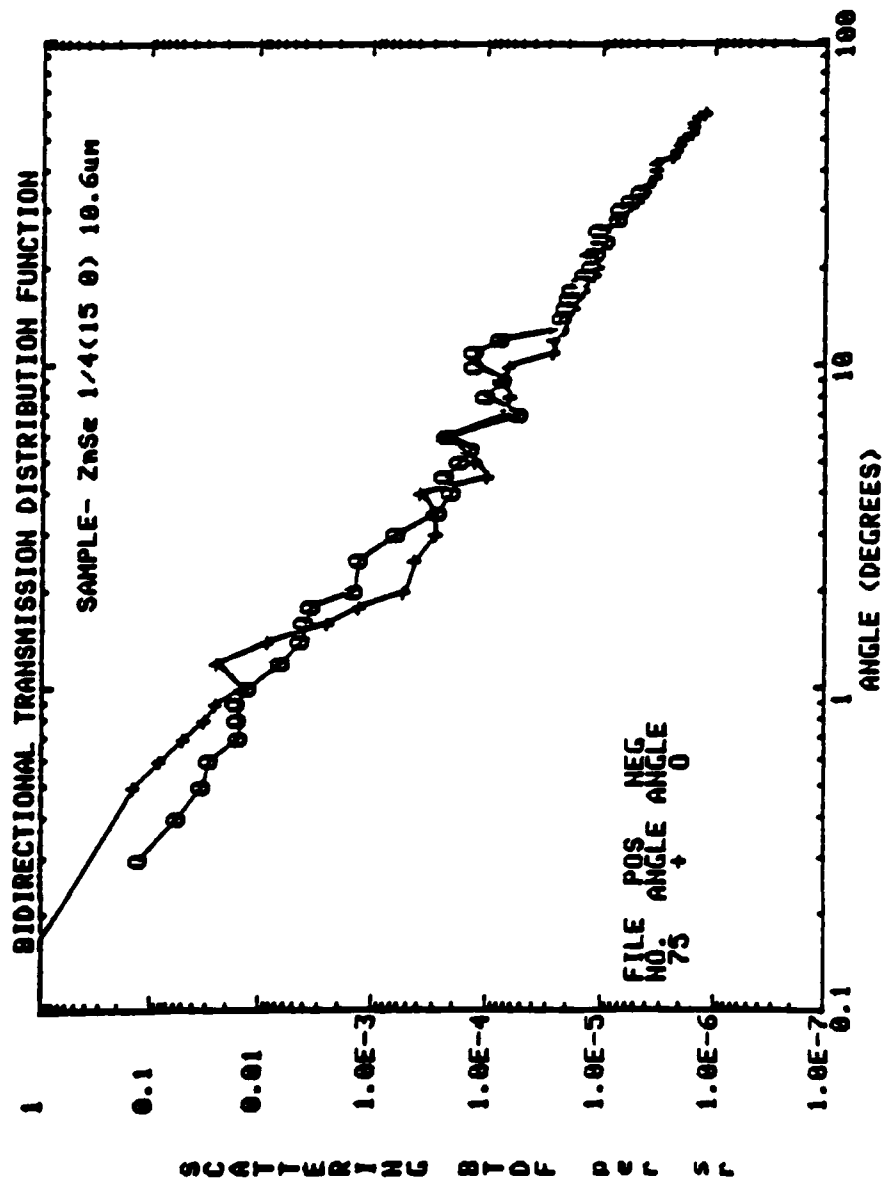
ANGLE

BI0F DATA

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13

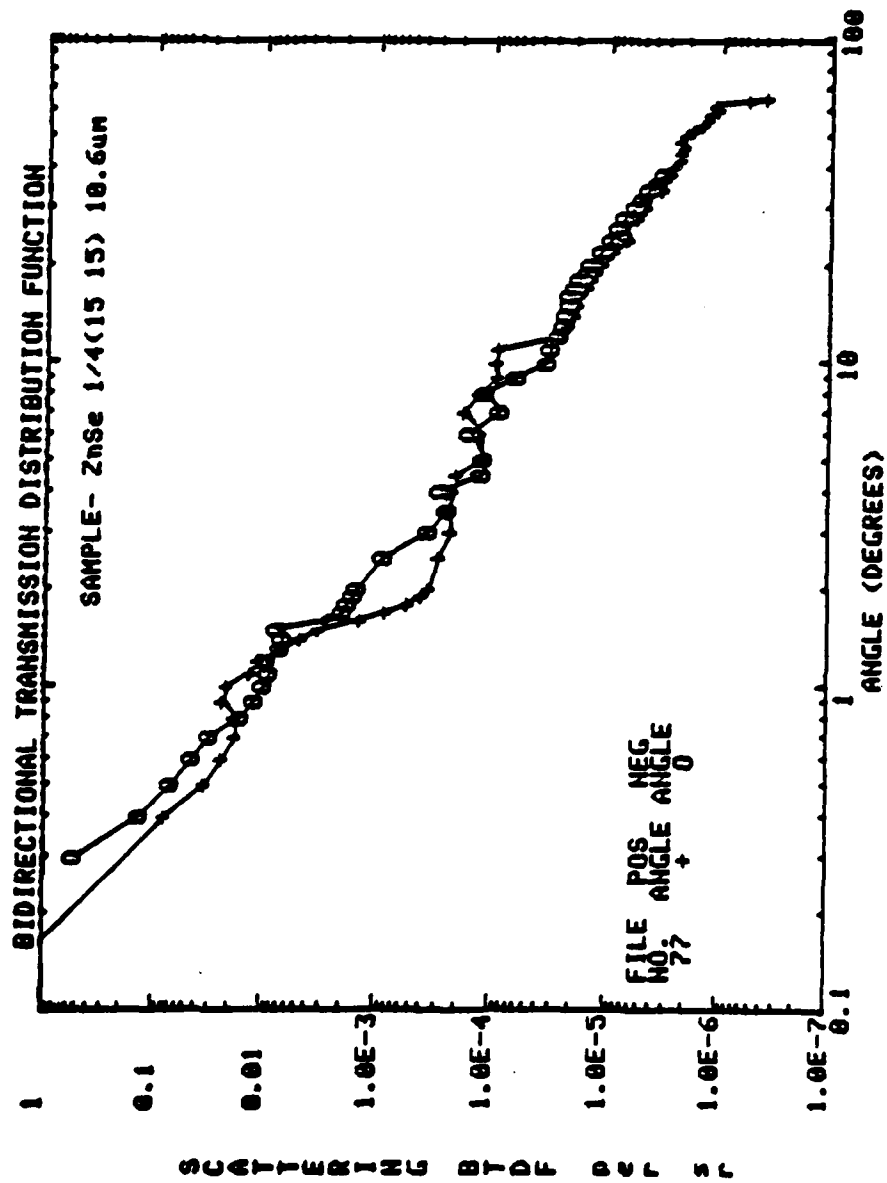
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5.	493903961E-4
3.	75810926E-4
2.	942792248E-4
4.	791395956E-4
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0.	00902936960226
0.	00949426570178
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0.	0190158190551
0.	0273629852844
0.	0356752092778
0.	0448676410518
0.	0551392841331
0.	0881738685164
0.	116769143227
0.	202478428104
0.	460631916129
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2207.	65318689



SAMPLE - ZnS: 1/4(15 0) 10.6um

ANGLE	BTDF DATA	ANGLE	BTDF DATA	ANGLE	BTDF DATA
0	16360.7221395	14	2.036535066E-5	-26	1.043026005E-5
0.1	13664.2332457	15	1.712917932E-5	-24	9.028523134E-6
0.2	7690.72621681	16	1.632530633E-5	-22	1.104855649E-5
0.3	2444.54288988	17	1.401669855E-5	-20	1.214099704E-5
0.4	4.58406495787	18	1.402062154E-5	-19	1.30106168E-5
0.5	0.137120798039	19	1.053319098E-5	-18	1.500613697E-5
0.6	0.076729298017	20	1.053319098E-5	-17	1.776822674E-5
0.7	0.046788826022	22	1.306862839E-5	-16	1.884086308E-5
0.8	0.0297945994741	24	1.069818152E-5	-15	2.007679983E-5
0.9	0.023704393894	26	9.255309808E-6	-14	2.166395096E-5
1	0.014076763267	28	7.64752140E-6	-13	2.271517036E-5
1.2	0.023230306695	30	5.771745388E-6	-12	7.483978761E-5
1.4	0.087927891357	32	4.699876856E-6	-11	1.258956101E-4
1.6	0.002389466521	34	4.040269761E-6	-10	1.257369289E-4
1.8	0.001257363643	36	3.751703433E-6	-9	7.166840069E-5
2	5.089706733E-4	38	3.195153986E-6	-8	1.005259518E-4
2.5	4.122504326E-4	40	3.215791150E-6	-7	5.200700081E-5
3	2.743051306E-4	42	3.133358817E-6	-6	2.18810147E-4
3.5	2.917465412E-4	44	2.205737297E-6	-5	1.373112505E-4
4	3.662688193E-4	46	2.102683022E-6	-5	1.696378564E-4
4.5	9.830593625E-5	48	1.968705688E-6	-4	2.314946241E-4
5	1.214554254E-4	50	1.842972661E-6	-4	2.013685716E-4
6	2.314947932E-4	52	1.525517537E-6	-3	2.663772768E-4
7	7.341243419E-5	54	1.486363465E-6	-3	6.0251994E-4
8	6.152061401E-5	56	1.484317086E-6	-2	0.00129858806282
9	7.483956886E-5	58	1.368884684E-6	-2	0.00141750710887
10	6.263062661E-5	60	1.181294447E-6	-1	0.00338520981066
11	2.531231132E-5	-35	4.12273444E-6	-1	0.00384978415034
12	2.529172568E-5	-34	4.411314943E-6	-1	0.00408444962735
13	2.2673945E-5	-32	5.42134918E-6	-1	0.00622022340897
		-30	6.761187455E-6	-1	0.012180411739
		-28	7.049736782E-6	-0.9	0.0153547391618
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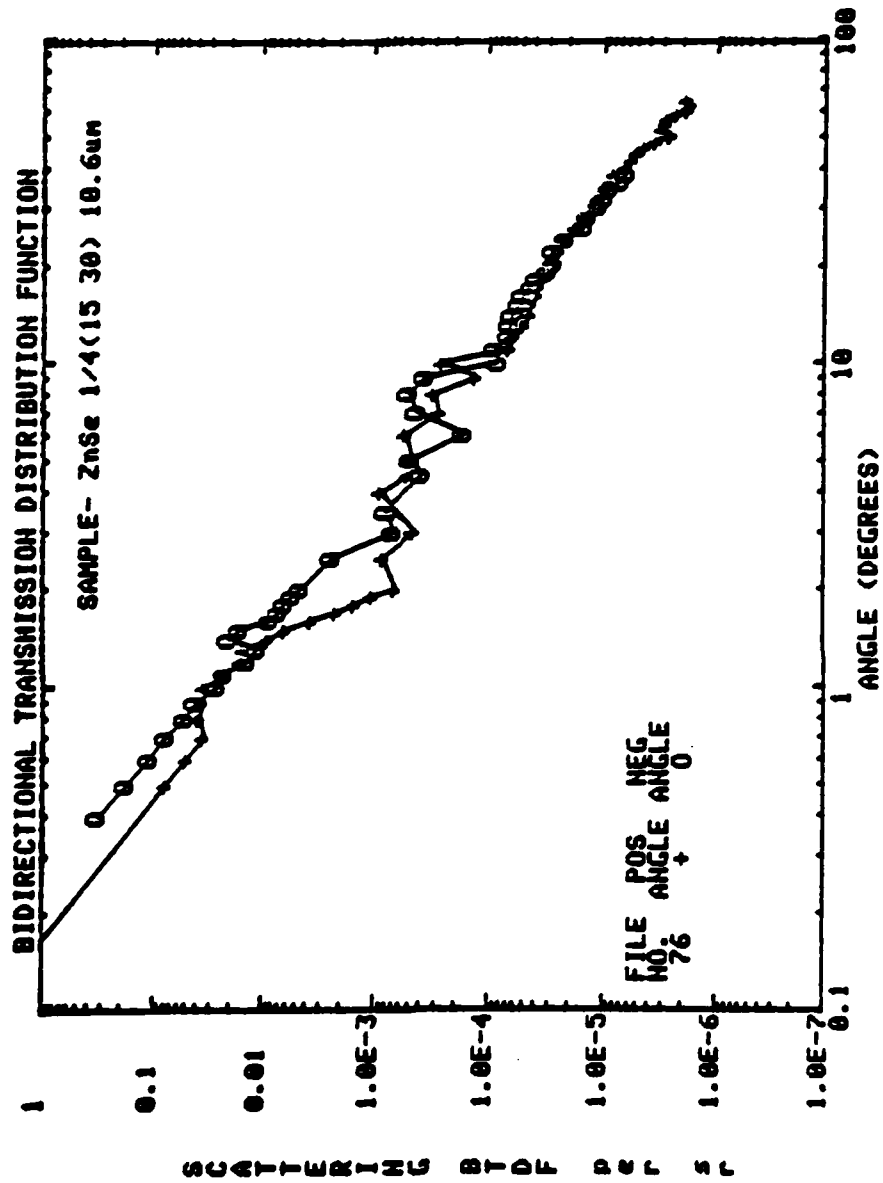
SAMPLE - ZnSe 1/4(15) 10.6um

ANGLE	BTDF DATA	ANGLE	UTDF DATA	ANGLE	DTDF DATA
0	1478.4831465	9	9.133139397E-5	-2.5	0.625712849E-4
0.1	10314.0155651	10	9.323421353E-5	-2	0.00144607523845
0.2	2179.38720230	11	9.047745219E-5	-1.9	0.00154121173941
0.3	3.23188243512	12	2.516053219E-5	-1.8	0.00175368328655
0.4	0.0748343802573	13	2.226211817E-5	-1.7	0.00189004560906
0.5	0.0323115307918	14	1.970612188E-5	-1.6	0.00235145771419
0.6	0.0223190258979	15	1.840752146E-5	-1.5	0.00729855677867
0.7	0.0168851455115	16	1.813957692E-5	-1.4	0.0064994099138
0.8	0.0178698085491	17	1.53900500E-5	-1.3	0.00680384669206
0.9	0.0218084604013	18	1.37902446E-5	-1.2	0.00890160682503
1	0.0199485417135	19	1.253205965E-5	-1.1	0.00834505810833
1.1	0.0122535833291	20	1.115179168E-5	-1	0.009456569651
1.2	0.0105775951425	22	9.090497776E-6	-0.9	0.011479806115
1.3	0.00641061574831	24	6.678761568E-6	-0.8	0.0155437207814
1.4	0.00439530721665	26	7.338426388E-6	-0.7	0.0292481354217
1.5	0.00306022476273	28	5.524461031E-6	-0.6	0.0416475940774
1.6	0.00135569544547	30	4.720553675E-6	-0.5	0.0669935463483
1.7	0.197597147E-4	32	4.720580834E-6	-0.4	0.130340192514
1.8	5.280077165E-4	34	3.401312698E-6	-0.3	0.51858912466
1.9	3.948165876E-4	36	3.751775346E-6	-0.2	351.721585251
2	3.456627215E-4	38	2.906615145E-6	-0.1	8885.59793082
2.5	2.885808343E-4	40	2.741720656E-6	0	13464.9368109
3	2.235708947E-4	42	2.350064159E-6		
3.5	2.362558037E-4	44	2.308853389E-6		
4	2.203997479E-4	46	2.185183064E-6		
4.5	1.997868612E-4	48	2.329507927E-6		
5	1.227262418E-4	50	1.814163737E-6		
5.5	1.284345046E-4	52	1.443098986E-6		
6	1.760029458E-4	54	1.331787802E-6		
7	1.30178846E-4	56	1.276138345E-6		
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		60	1.142158949E-6		
		62			

ZnSe 1/4 (15 15) 10.6 μ m

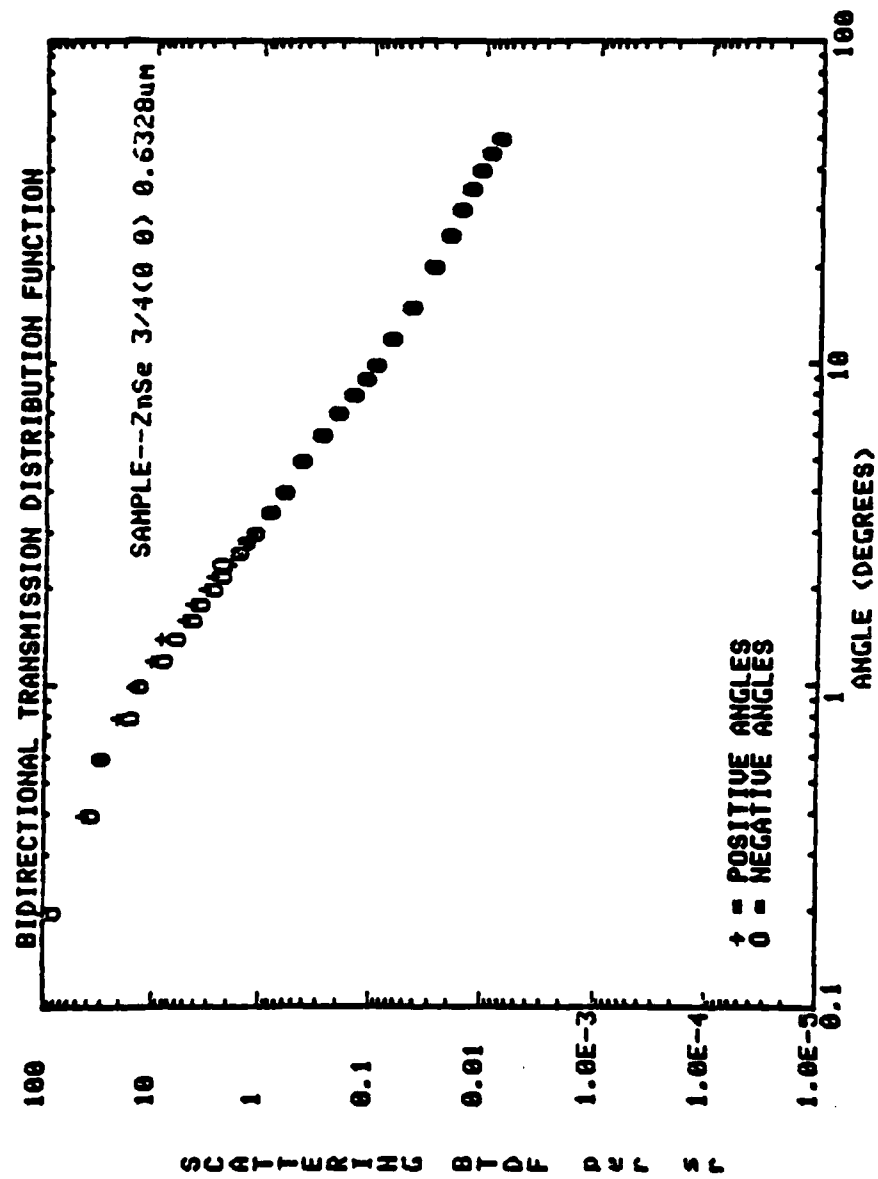
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-0.7
-0.6
-0.5
-0.4
-0.3
-0.2
-0.1
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BTDF DATA
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0.108522353205
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SAMPLE - ZnSe 1/4(15 30) 10.6um

ANGLE	BTDF DATA	ANGLE	BTDF DATA	ANGLE	BTDF DATA	UTDF DATA
0	20159.0039814	9	1.29364217E-4	64	1.005539167E-6	
0.1	16275.1361047	10	2.53067932E-4	-40	5.584532356E-6	
0.2	3132.06073566	11	6.550128654E-5	-38	6.407014002E-6	
0.3	1.70250662069	12	5.07202047E-5	-36	7.294421933E-6	
0.4	2.26081051579	13	4.085059187E-5	-34	9.025976018E-6	
0.5	0.076356235422	14	4.419717924E-5	-32	9.935007162E-6	
0.6	0.0491602080131	15	4.248735533E-5	-30	1.116070196E-5	
0.7	0.0340807674435	16	3.766077667E-5	-28	1.38742237E-5	
0.8	0.0376803094357	17	3.75742577E-5	-26	1.499967038E-5	
0.9	0.034770041908	18	3.294246146E-5	-24	2.179595699E-5	
1	0.0344254052322	19	3.155720729E-5	-22	2.69905008E-5	
1.1	0.0212526141157	20	2.66440953E-5	-20	2.722849057E-5	
1.2	0.0153554925249	22	2.430660896E-5	-19	3.064022963E-5	
1.3	0.0143598747223	24	2.233706814E-5	-18	3.831022127E-5	
1.4	0.0084641785538	26	1.738057068E-5	-17	4.205459834E-5	
1.5	0.00600201156161	28	1.337639664E-5	-16	5.025765714E-5	
1.6	0.00354792977021	30	1.125528105E-5	-15	5.43916067E-5	
1.7	0.00207614664061	32	1.116876622E-5	-14	6.210339665E-5	
1.8	0.00142683055321	34	9.805197838E-6	-13	6.491046744E-5	
1.9	9.989478958E-4	36	8.78793859E-6	-12	6.731287749E-5	
2	6.443214044E-4	38	8.030412821E-6	-11	8.776637522E-5	
2.5	8.224672016E-4	40	6.32047848E-6	-10	8.309119265E-5	
3	4.412020976E-4	42	5.671157406E-6	-9	3.596225337E-4	
3.5	6.54311134E-4	44	5.130057373E-6	-8	4.978104295E-4	
4	8.524360277E-4	46	4.437428459E-6	-7	4.295484998E-4	
4.5	4.944795902E-4	48	3.463309008E-6	-6	1.653261252E-4	
5	4.661761473E-4	50	2.619211757E-6	-5	4.011603806E-4	
5.5	5.27782647E-4	52	3.073814794E-6	-4.5	3.879250657E-4	
6	2.697164999E-4	54	2.900670662E-6	-3.5	7.941630955E-4	
7	2.996852004E-4	56	2.792465188E-6	-3	6.759549118E-4	
8		58	2.294600073E-6	-2.5	0.00229258570156	
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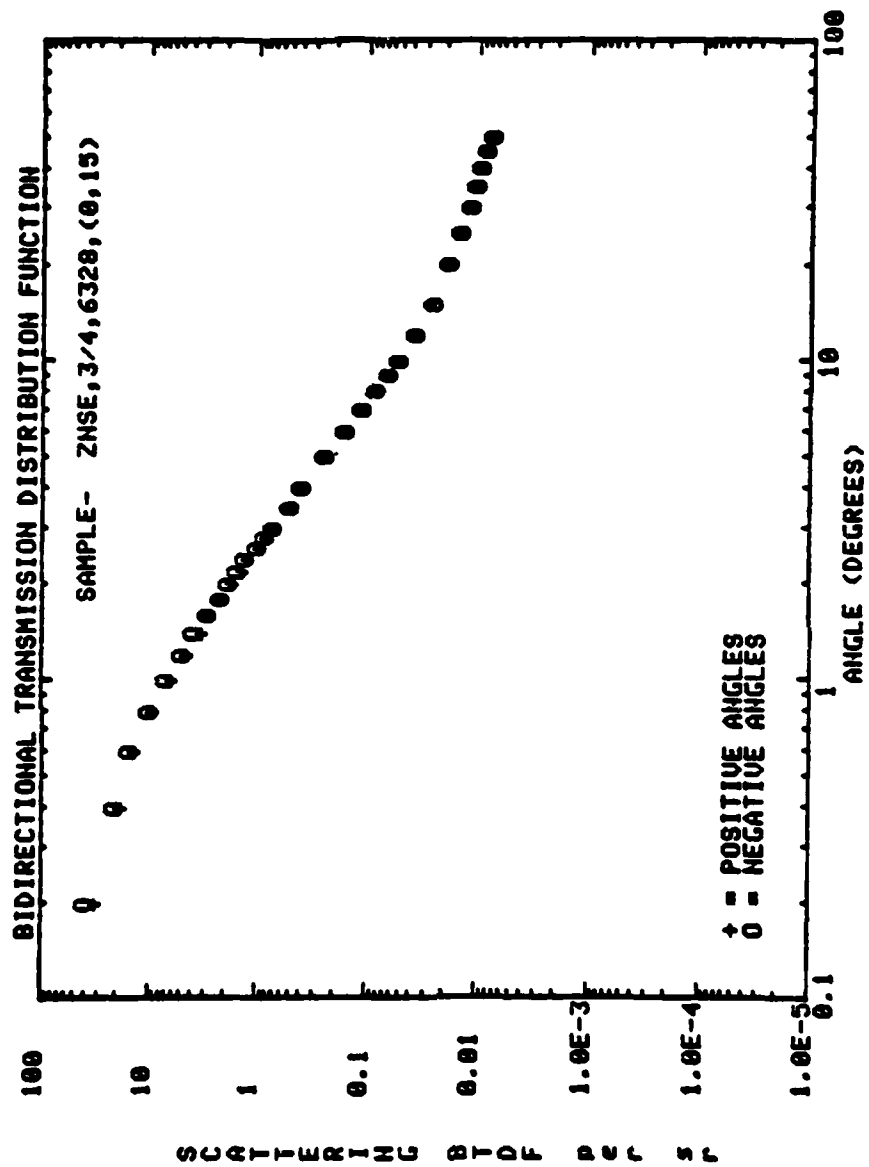
SAMPLE--ZnSe 3/4(0 0) 0.6320um

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2.4
2.6
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BTDF DATA
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0.00747120097781

ANGLE
0
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-0.8
-1
-1.2
-1.4
-1.6
-1.8
-2
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BTDF DATA
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2.1764232068
2.27105039968
1.52437956678
1.33383218777
1.12150794068
0.800299476406
0.593419442894
0.411010021447
0.273737658899
0.194604175766
0.145347618323
0.113048236749
0.0904386691232
0.0657044328647
0.0440361151772
0.028134413129
0.0202709688979
0.0160597052668
0.0128519383161
0.0106077885245
0.00877300638912
0.00733517428941



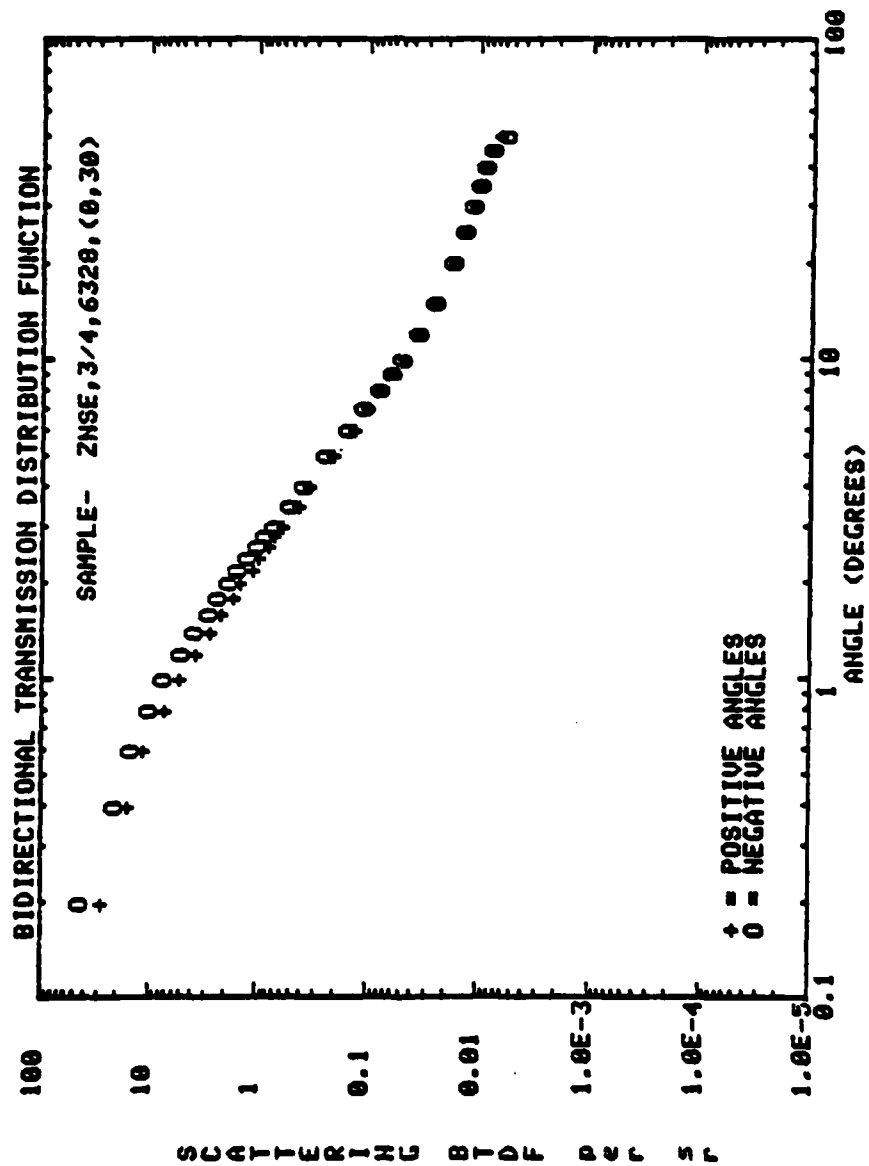
SAMPLE--ZnSe 3/4(0 15) 0.6328um

ANGLE
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3
3.5
4
5
6
7
8
9
10
12
15
20
25
30
35
40
45
50

BTDF DATA
99279.8353909
30.0823045826
17.4314130238
13.1755832105
8.91975335128
5.82664636087
4.23096736086
3.15106338668
2.64334736471
1.90251058608
1.62722938292
1.30829933357
1.16769578531
0.983703987138
0.786557213403
0.694513321553
0.493650266871
0.367352810421
0.231824685902
0.153361024327
0.109671031219
0.0838136919437
0.064197721236
0.0526065540863
0.037448098663
0.0267492504303
0.0173871539517
0.0137315367233
0.011413709527
0.010165186786
0.0094520048089
0.0085604750402
0.0074905807476

ANGLE
0
-0.2
-0.4
-0.6
-0.8
-1
-1.2
-1.4
-1.6
-1.8
-2
-2.2
-2.4
-2.6
-2.8
-3
-3.5
-4
-5
-6
-7
-8
-9
-10
-12
-15
-20
-25
-30
-35
-40
-45
-50

BTDF DATA
104938.271605
38.1858711271
20.1714679138
14.8662553923
9.85253801546
6.72925271276
4.75480141506
3.71519238174
2.78840911034
2.11951335016
1.76611829758
1.4574763218
1.25342969825
0.966461268467
0.807476288227
0.698697136743
0.493690266871
0.387860370227
0.236282852939
0.156035925914
0.107887762419
0.0820304219023
0.064197721236
0.0508232810664
0.035665533206
0.02496559670683
0.017832978412
0.0141773658377
0.0115025379132
0.010165186786
0.00936283494434
0.00829296019522
0.00740140716736



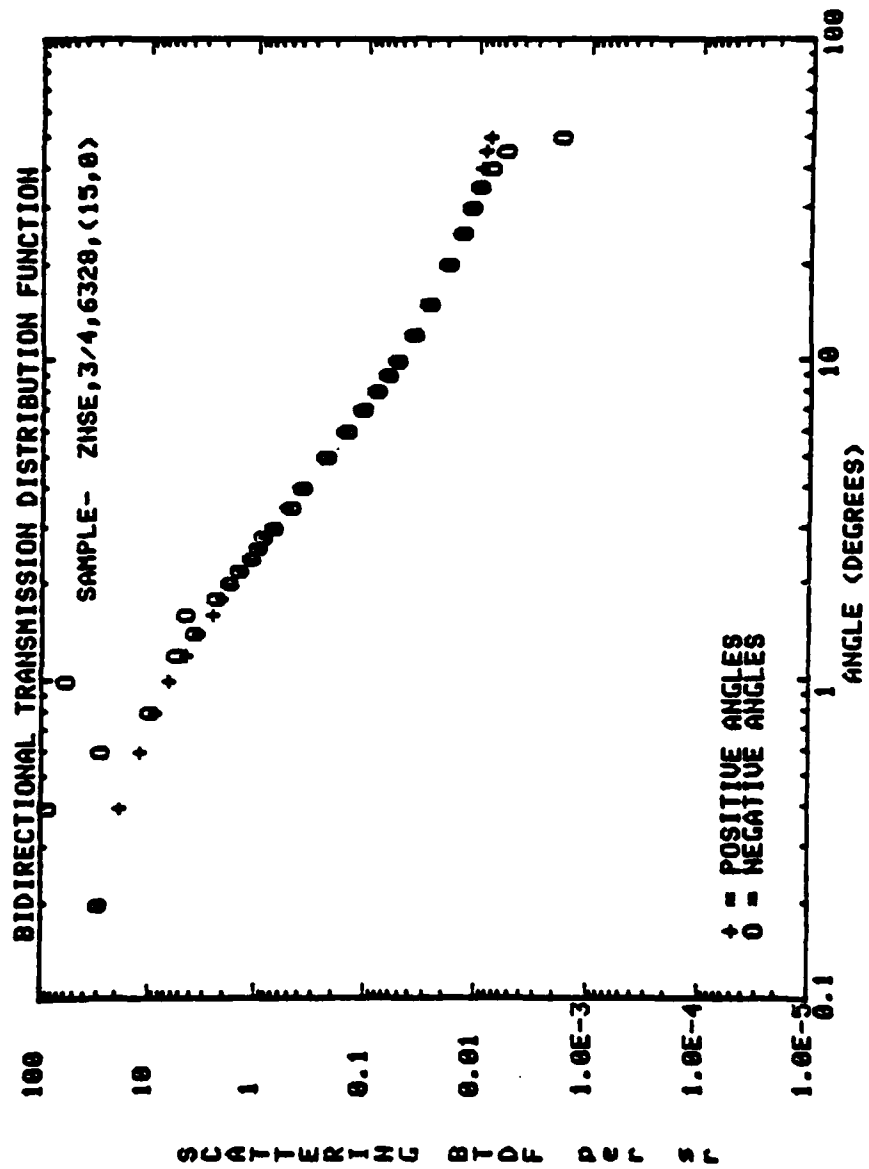
SAMPLE--ZnSe 3/4(0 30) 0.6328um

ANGLE
0 0.2 0.4 0.6 0.8 1 1.2 1.4 1.6 1.8 2 2.2 2.4 2.6 2.8 3 3.5 4 5 6 7 8 9 10 12 15 20 25 30 35 40 45 50

BTDF DATA
90020.5761317
26.0596708303
14.8662552544
10.7270234988
6.87928689837
5.02074783239
3.52983562678
2.60305236291
2.03892342461
1.58762026609
1.37680640093
1.03566552749
0.917352782877
0.748902841193
0.661042764456
0.55644742028
0.405830134631
0.326337690811
0.195267716202
0.129286918043
0.0971881496167
0.0731140716955
0.0570646863321
0.0454734620068
0.0329906182155
0.0246093103959
0.0160496805708
0.0128398784945
0.0107000352681
0.00945184034489
0.00829279666498
0.0077579305052
0.00633132420341

BTDF DATA
99794.2386831
41.8587106401
20.3463650344
14.224965944
9.79423897395
7.14831994756
4.81927329866
3.67489745352
2.70781925166
2.22428016975
1.748971518
1.45404696575
1.18655724439
0.949725949446
0.811660103192
0.681961875983
0.481138819408
0.367352810421
0.227366518866
0.147119587291
0.105212859218
0.0757889767576
0.0588479577799
0.0472567350267
0.0347738948758
0.0242526537235
0.0166738348152
0.0131073759631
0.0110567031104
0.00971934526031
0.00856030623482
0.00749041566019
0.0057071091411

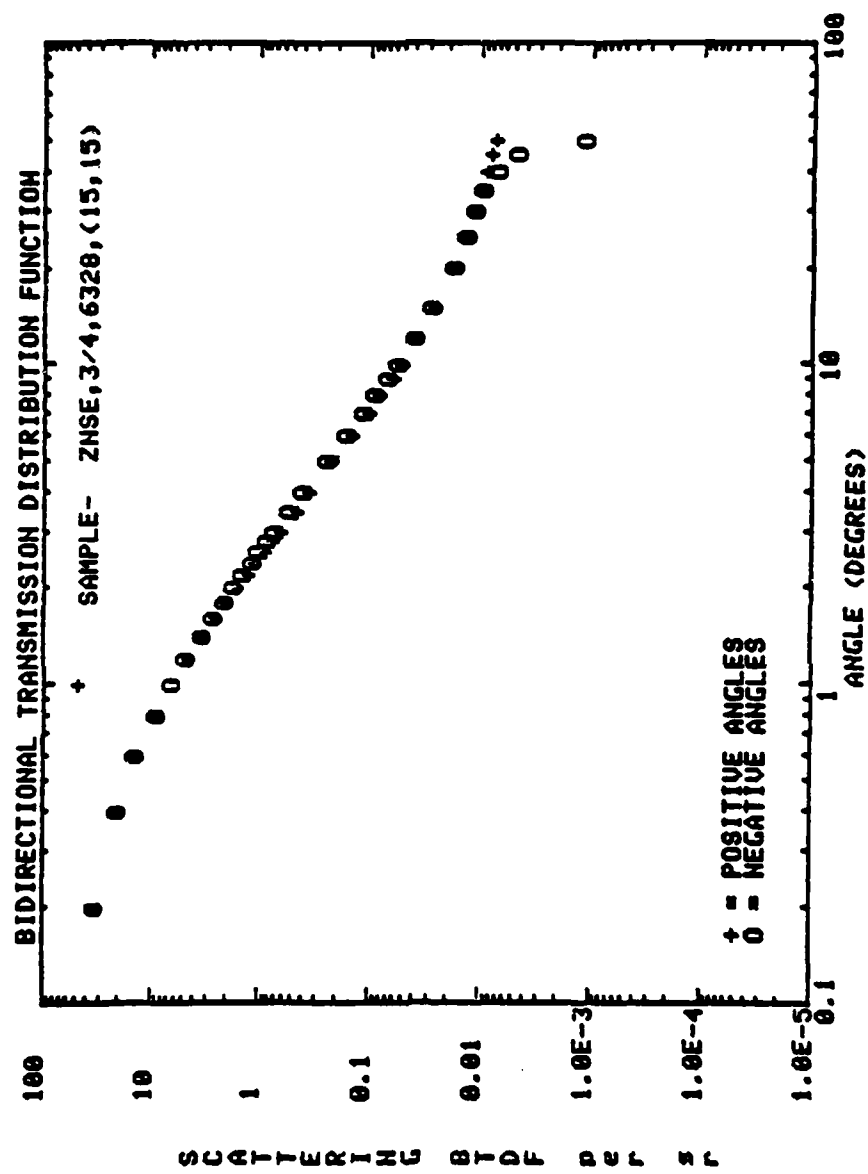
ANGLE
0 -0.2 -0.4 -0.6 -0.8 -1 -1.2 -1.4 -1.6 -1.8 -2 -2.2 -2.4 -2.6 -2.8 -3 -3.5 -4 -5 -6 -7 -8 -9 -10 -12 -15 -20 -25 -30 -35 -40 -45 -50



SAMPLE--ZnSe 3/4(15 0) 0.6328um

SAMPLE-ZNSE, 3/4, 6328, (15, 0)

ANGLE	BTDF DATA	BTDF DATA	ANGLE
0	94029.8507463	92537.3134328	0
0.2	29.6019901047	28.5306799866	-0.2
0.4	17.5356551882	81.7578778872	-0.4
0.6	11.671641986	26.7827533495	-0.6
0.8	8.34494220467	9.30348286332	-0.8
1	6.18872333854	56.3847455679	-1
1.2	4.30248784964	5.28457746749	-1.2
1.4	3.26503777623	3.58540662787	-1.4
1.6	2.41625235996	4.2713106234	-1.6
1.8	2.00315121323	2.25257081954	-1.8
2	1.61343313525	1.67570803903	-2
2.2	1.34991738439	1.3781097622	-2.2
2.4	1.09121090521	1.06759365191	-2.4
2.6	0.953565804877	0.92039829862	-2.6
2.8	0.783502374575	0.800158005514	-2.8
3	0.675788010211	0.663350194072	-3
3.5	0.514096477924	0.464345205867	-3.5
4	0.375124656577	0.368491152482	-4
5	0.229386667392	0.219038396682	-5
6	0.153499427195	0.144013507537	-6
7	0.104345179175	0.104345179175	-7
8	0.0814927792920	0.0787332354437	-8
9	0.06633833227757	0.0627796720826	-9
10	0.0521727130382	0.0514828259236	-10
12	0.0372539802371	0.0364778556489	-12
15	0.0258709168341	0.0253709168341	-15
20	0.0174198921061	0.0172474179268	-20
25	0.0143155063215	0.013206504420	-25
30	0.0111248426385	0.0103661253678	-30
35	0.00965892375205	0.00931396218948	-35
40	0.00808291479069	0.00741680264077	-40
45	0.0081931412232	0.00534710269303	-45
50	0.00758960335033	0.00172490985235	-50



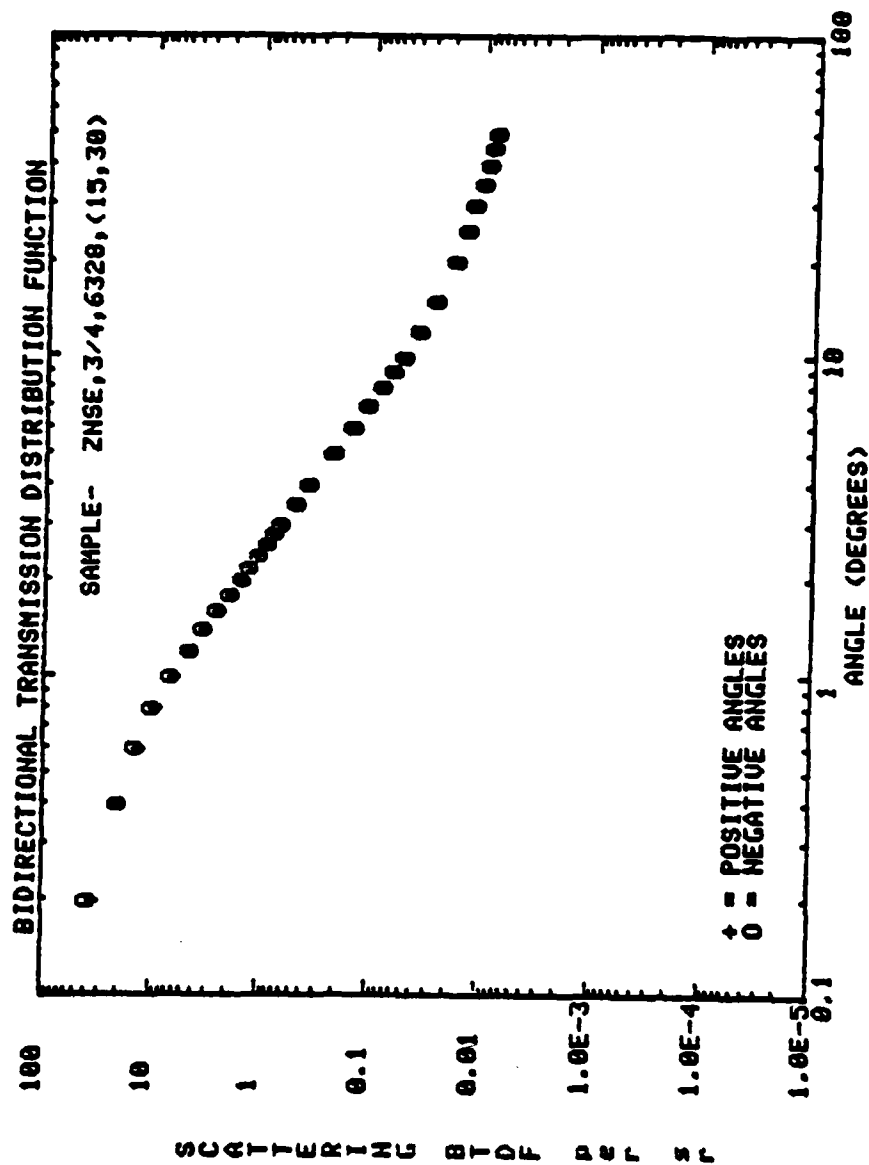
SAMPLE--2nsz 3/4(15 15) 0.6328um

ANGLE
0 0.2 0.4 0.6 0.8 1 1.2 1.4 1.6 1.8 2 2.2 2.4 2.6 2.8 3 3.5 4 5 6 7 8 9 10 12 15 20 25 30 35 40 45 50

BTDF DATA
98049.7512438
32.4776120006
20.2985076134
12.9684910955
9.02155914019
46.1791066201
4.23233859122
3.14892234274
2.34610309709
1.8862357276
1.50431205364
1.19071336854
1.03316777196
0.841625471261
0.703663694779
0.609452996803
0.435323630501
0.335456302089
0.209552481865
0.137114656877
0.0974463243535
0.0773534635192
0.0588993604841
0.0489819851334
0.036046675322
0.0246636673819
0.0162980099408
0.013108174463
0.010952364458
0.00965892375205
0.00862418911717
0.0078401668559
0.00715037588724

ANGLE
0 -0.2 -0.4 -0.6 -0.8 -1 -1.2 -1.4 -1.6 -1.8 -2 -2.2 -2.4 -2.6 -2.8 -3 -3.5 -4 -5 -6 -7 -8 -9 -10 -12 -15 -20 -25 -30 -35 -40 -45 -50

BTDF DATA
86069.6517413
31.6882255978
20.0729686399
13.6451080223
0.6268659278
6.32902185251
4.57529052126
3.21907160285
2.54096215918
1.95535685053
1.63681622416
1.36152601855
1.10613628234
0.978441434569
0.820895820984
0.692371765062
0.514096477924
0.386922345095
0.230249023284
0.15522413986
0.107794606586
0.08520891634
0.0666602836811
0.0539836667139
0.0382025769561
0.0269919698969
0.0170749437476
0.0131944124529
0.0107798862776
0.0092272179884
0.0089935129374
0.00457091036663
0.00112119140403



SAMPLE-ZNSE, 3/4, 6328, (15, 30)

ANGLE	BTDF DATA
0	91233.4352701
0.2	31.6547740980
0.4	18.6000680959
0.6	12.4193002414
0.8	8.66462818796
1	5.78117593931
1.2	4.27200164457
1.4	3.0662591983
1.6	2.3236496134
1.8	1.72477050147
2	1.44529418599
2.2	1.2725113289
2.4	1.03465878823
2.6	0.840978057034
2.8	0.72629959377
3	0.632857892528
3.5	0.458715857041
4	0.35073080742
5	0.209378428382
6	0.14135259763
7	0.102480695093
8	0.0788925210405
9	0.0617535450198
10	0.0505337037045
12	0.0365751679061
15	0.0257087291292
20	0.0175810262399
25	0.0137822548978
30	0.0118387546177
35	0.0101602784389
40	0.00910023380697
45	0.00830523151838
50	0.00768692624566

ANGLE

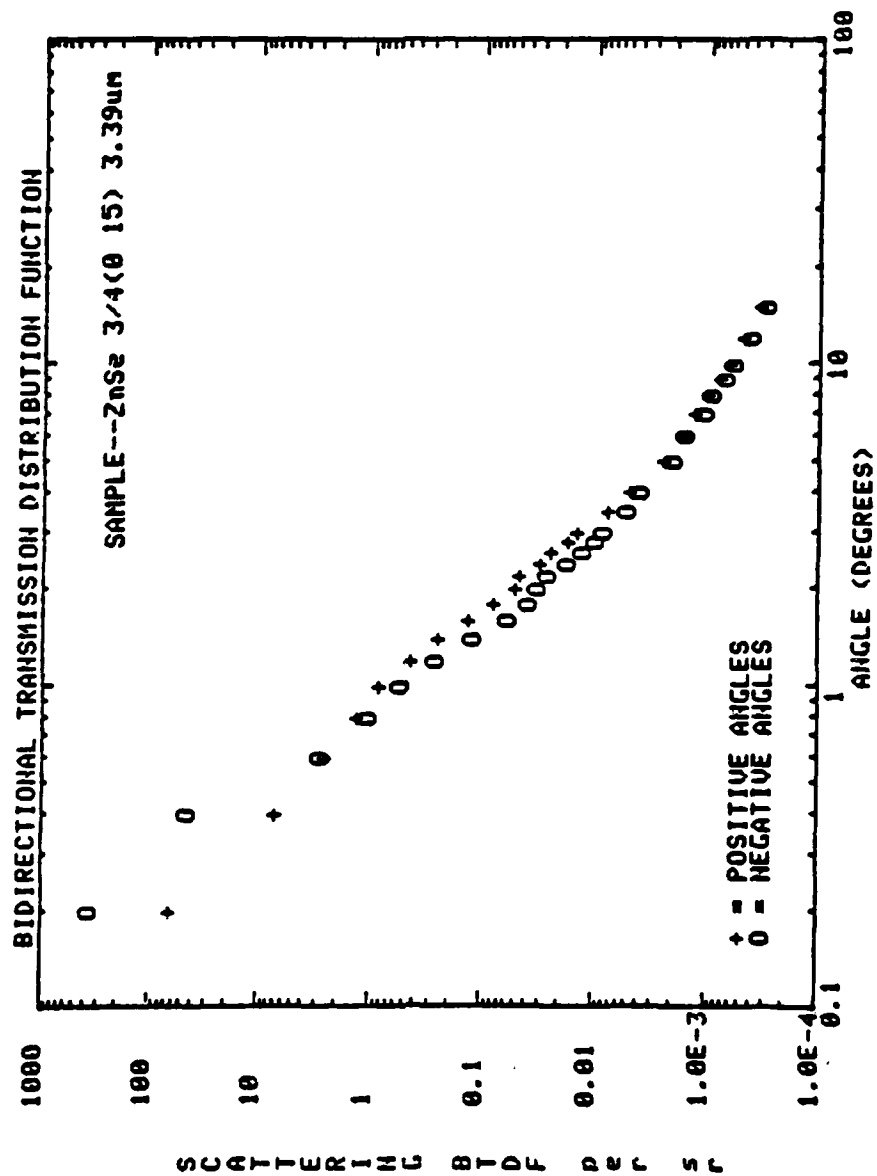
0
-0.2
-0.4
-0.6
-0.8
-1
-1.2
-1.4
-1.6
-1.8
-2
-2.2
-2.4
-2.6
-2.8
-3
-3.5
-4
-5
-6
-7
-8
-9
-10
-12
-15
-20
-25
-30
-35
-40
-45
-50

BTDF DATA

92762.4872579
36.1026164448
19.5242950821
13.632348172
9.58885519468
6.40400981122
4.31192689358
3.23394524821
2.44342536667
1.86951675946
1.43730913524
1.20965028862
0.998980098976
0.840978857034
0.72629959377
0.632857892528
0.458715857041
0.35073080742
0.209378428382
0.14135259763
0.102480695093
0.0788925210405
0.0617535450198
0.0505337037045
0.0365751679061
0.0257087291292
0.0175010262399
0.0137822548978
0.0118387546177
0.0101602784389
0.00910023380697
0.00830523151838
0.00768692624566

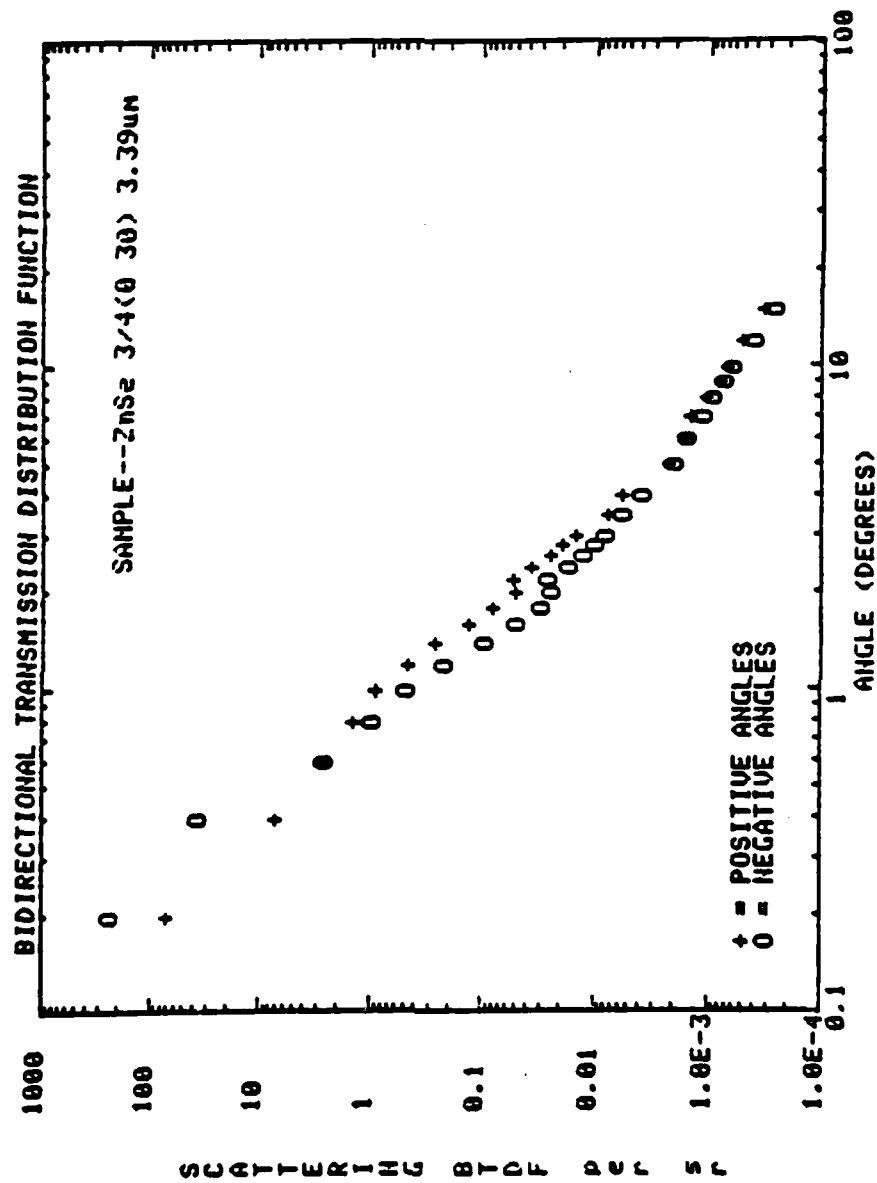
SAMPLE--ZnS₂ 3/4(0 0) 3.39um

ANGLE	BTDF DATA	ANGLE	BTDF DATA
0	97999.5946945	0	104254.887973
0.2	58.9048484213	-0.2	227.36936804
0.4	7.36310605266	-0.4	48.194875981
0.6	1.67343319379	-0.6	2.00811983254
0.8	0.920388256582	-0.8	1.08773157596
1	0.485295626198	-1	0.326319472788
1.2	0.409991132478	-1.2	0.317952306819
1.4	0.225913481161	-1.4	0.0920388256582
1.6	0.108773157596	-1.6	0.0368155302633
1.8	0.0920388256582	-1.8	0.0292850808913
2	0.0920388256582	-2	0.0200811983254
2.2	0.0384889634571	-2.2	0.0175710485348
2.4	0.02694227442	-2.4	0.0130362475754
2.6	0.0192444817235	-2.6	0.00866001677784
2.8	0.0142409164791	-2.8	0.00750534787413
3	0.0146258061137	-3	0.00538845488399
3.5	0.00635067897042	-3.5	0.00404134116299
4	0.00481112043213	-4	0.00327156189385
5	0.00192444817235	-5	0.00157804750174
6	0.00125089131235	-6	0.00111617594026
7	0.00111617994026	-7	9.622240864E-4
8	8.275127143E-4	-8	0.00100071304988
9	5.565789336E-4	-9	7.312903057E-4
10	5.063565249E-4	-10	5.773344519E-4
12	3.848896346E-4	-12	4.041341163E-4
15	2.694227442E-4	-15	2.11689299E-4



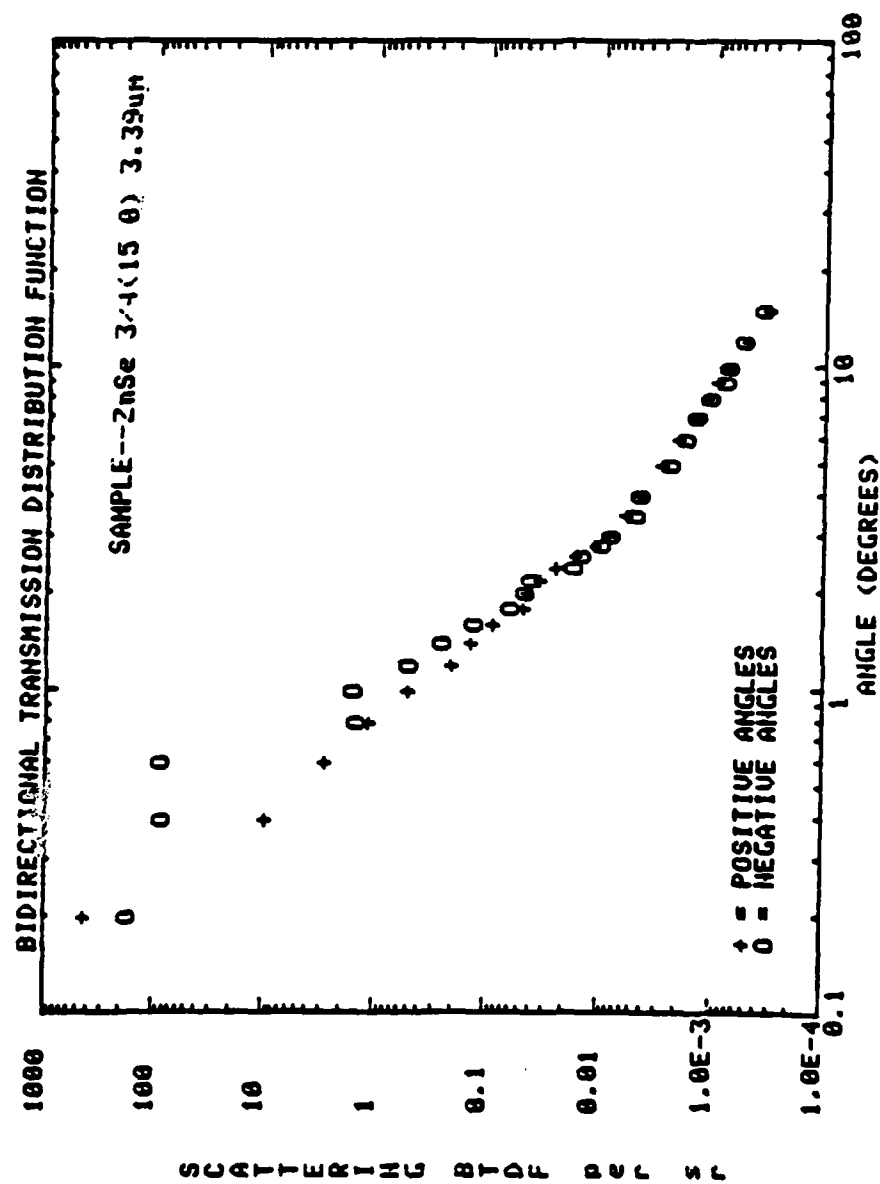
SAMPLE--ZnSe 3/4(0 15) 3.39um

ANGLE	BTDF DATA	ANGLE	BTDF DATA
0	102169.790213	0	102169.790213
0.2	61.5823415313	-0.2	346.467608441
0.4	6.69373277514	-0.4	42.8398897609
0.6	2.42647813099	-0.6	2.67749311006
0.8	1.25507489534	-0.8	1.00405991627
1	0.794860767048	-1	0.518764290074
1.2	0.418358298446	-1.2	0.251014979068
1.4	0.23428064713	-1.4	0.117140323565
1.6	0.125507489534	-1.6	0.0568967285887
1.8	0.075304937204	-1.8	0.0368155302633
2	0.0485295626198	-2	0.030958514085
2.2	0.0442623079756	-2.2	0.0250178262471
2.4	0.0288667225928	-2.4	0.0169351479211
2.6	0.0230933780742	-2.6	0.0123164683063
2.8	0.0165502542865	-2.8	0.00942979604698
3	0.01347113721	-3	0.00803268232599
3.5	0.00731290305684	-3.5	0.00500355524942
4	0.00461867561485	-4	0.00384889634571
5	0.00230933780742	-5	0.00192444817285
6	0.00153955853828	-6	0.00152031405655
7	0.00123164683063	-7	0.00101995753161
8	9.622240864E-4	-8	8.852461595E-4
9	7.505347874E-4	-9	6.735568605E-4
10	6.158234153E-4	-10	5.773344519E-4
12	4.618675615E-4	-12	4.041341163E-4
15	3.271561894E-4	-15	2.886672259E-4



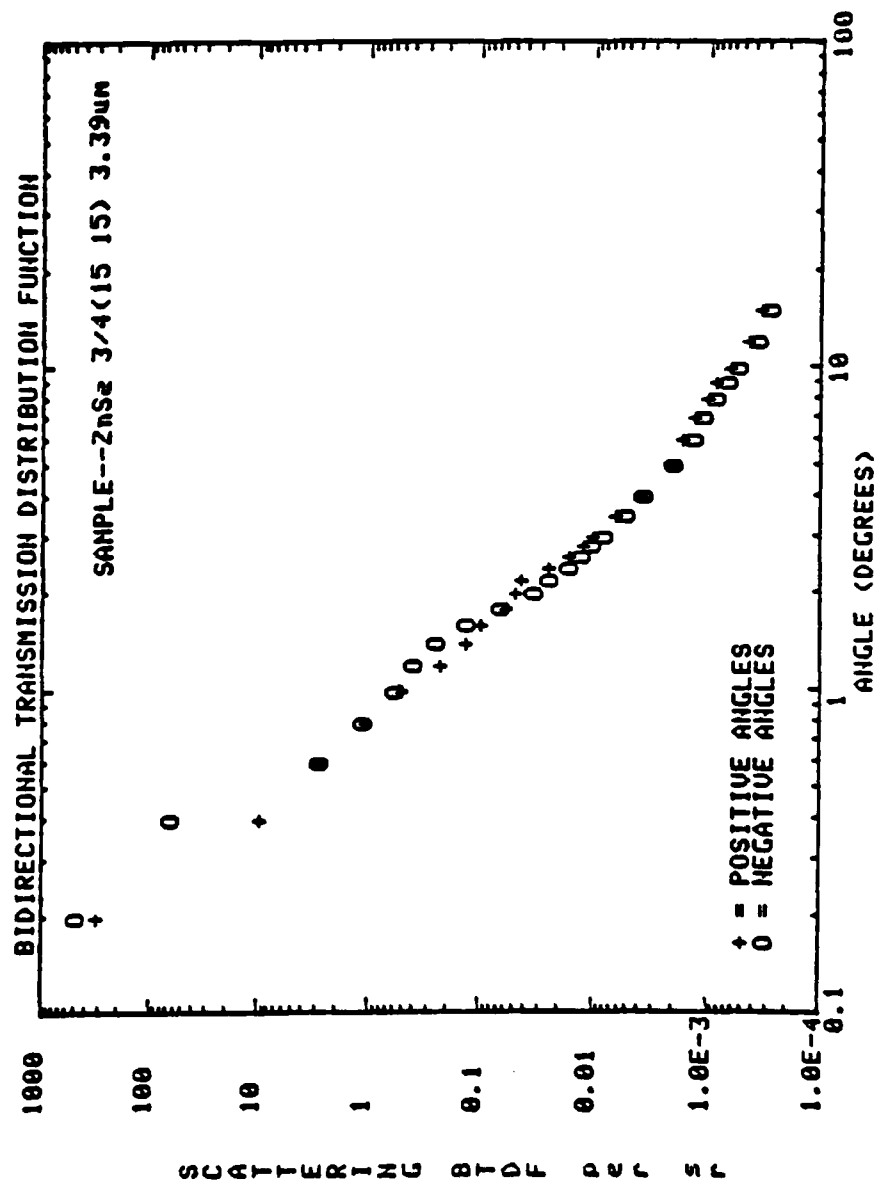
SAMPLE--ZnSe 3/4(0 30) 3.39um

ANGLE	BTDF DATA	ANGLE	BTDF DATA
0	102169.790213	0	102169.790213
0.2	66.9373277514	-0.2	227.36936804
0.4	6.77740443483	-0.4	34.8074104307
0.6	2.3428064713	-0.6	2.51014979068
0.8	1.33874655503	-0.8	0.920388256582
1	0.836716596893	-1	0.451826962322
1.2	0.443459796353	-1.2	0.217546315192
1.4	0.251014979068	-1.4	0.0920388256582
1.6	0.125507489534	-1.6	0.0485295626198
1.8	0.0769779269141	-1.8	0.0284493642944
2	0.0485295626198	-2	0.023428064713
2.2	0.0346400671114	-2.2	0.0250178262471
2.4	0.0230933780742	-2.4	0.0165502542865
2.6	0.0182822576421	-2.6	0.0119315786717
2.8	0.0138560268445	-2.8	0.00942579604698
3	0.00731290305684	-3	0.00769779269141
3.5	0.00532845488399	-3.5	0.00538845488399
4	0.00211689299014	-4	0.00365645152842
5	0.00153955853828	-5	0.00192444817285
6	0.001347113721	-6	0.00150106957483
7	0.00100071304988	-7	0.0010776909768
8	7.697792691E-4	-8	8.852461595E-4
9	6.543123788E-4	-9	7.12045824E-4
10	4.811120432E-4	-10	5.965789336E-4
12	3.079117077E-4	-12	3.648896346E-4
15		-15	2.501782625E-4



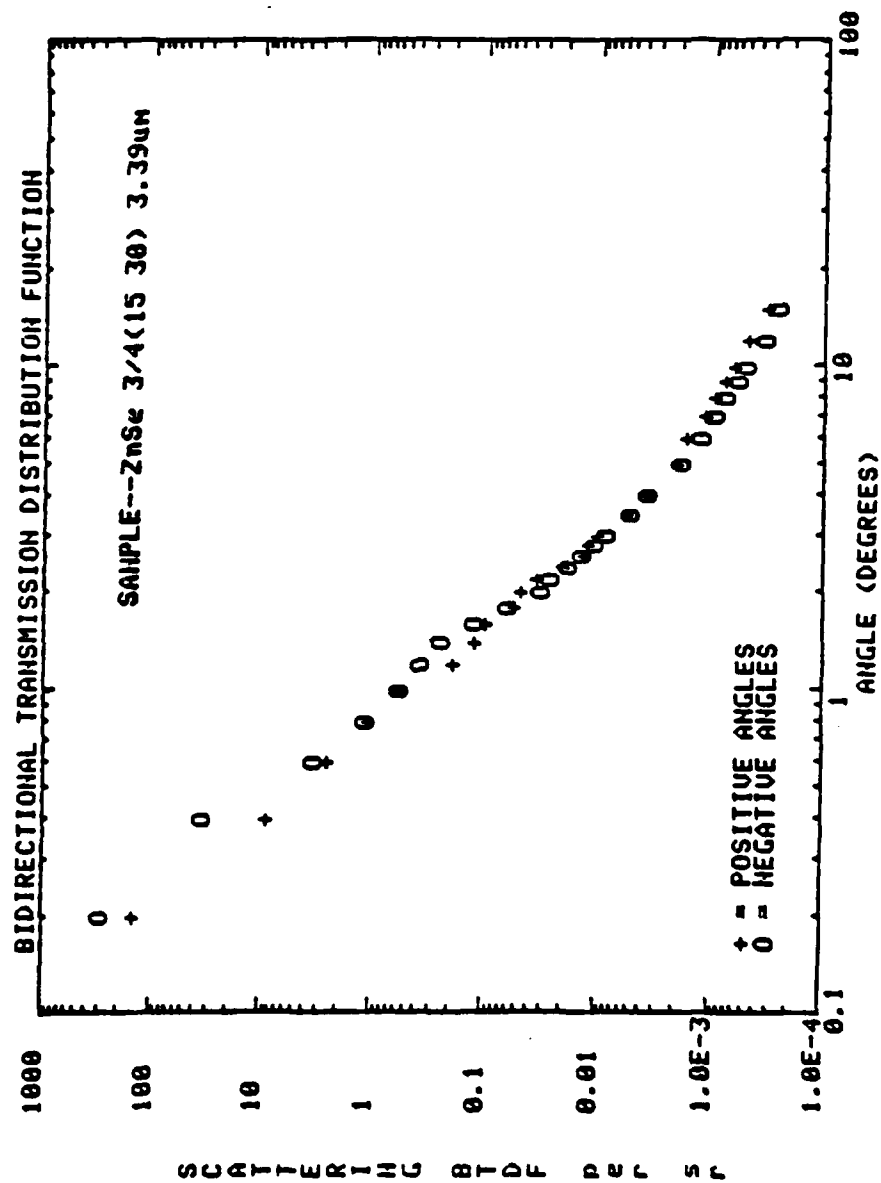
SAMPLE--ZnSe 3/4(15 0) 3.39um

ANGLE	BTDF DATA	ANGLE	BTDF DATA
0	104254.887973	0	104254.887973
0.2	411.430265024	-0.2	162.406691457
0.4	9.20388256582	-0.4	80.3247933017
0.6	2.67749311006	-0.6	83.0022864118
0.8	1.08773157596	-0.8	1.42241821472
1	0.405295626198	-1	1.50608987441
1.2	0.200811983254	-1.2	0.485295626198
1.4	0.133874655503	-1.4	0.242647813099
1.6	0.0836716596893	-1.6	0.125507489534
1.8	0.0451826962322	-1.8	0.0585701617825
2	0.0418358298446	-2	0.0435092630384
2.2	0.0327156189385	-2.2	0.0384889634571
2.4	0.0230933780742	-2.4	0.0165502542865
2.6	0.0157804750174	-2.6	0.0136635820273
2.8	0.0103920201334	-2.8	0.0092373512297
3	0.0078902375087	-3	0.00769779269141
3.5	0.00558083970128	-3.5	0.00461867561485
4	0.00423378590028	-4	0.00423378598028
5	0.002694227442	-5	0.00230933780742
6	0.00192444817285	-6	0.00167426991038
7	0.00130862475754	-7	0.001347113721
8	0.00111617994026	-8	0.00103920201334
9	9.044906412E-4	-9	7.697792691E-4
10	7.12045824E-4	-10	7.12045824E-4
12	4.811120432E-4	-12	5.196010067E-4
15	3.079117077E-4	-15	3.464006711E-4



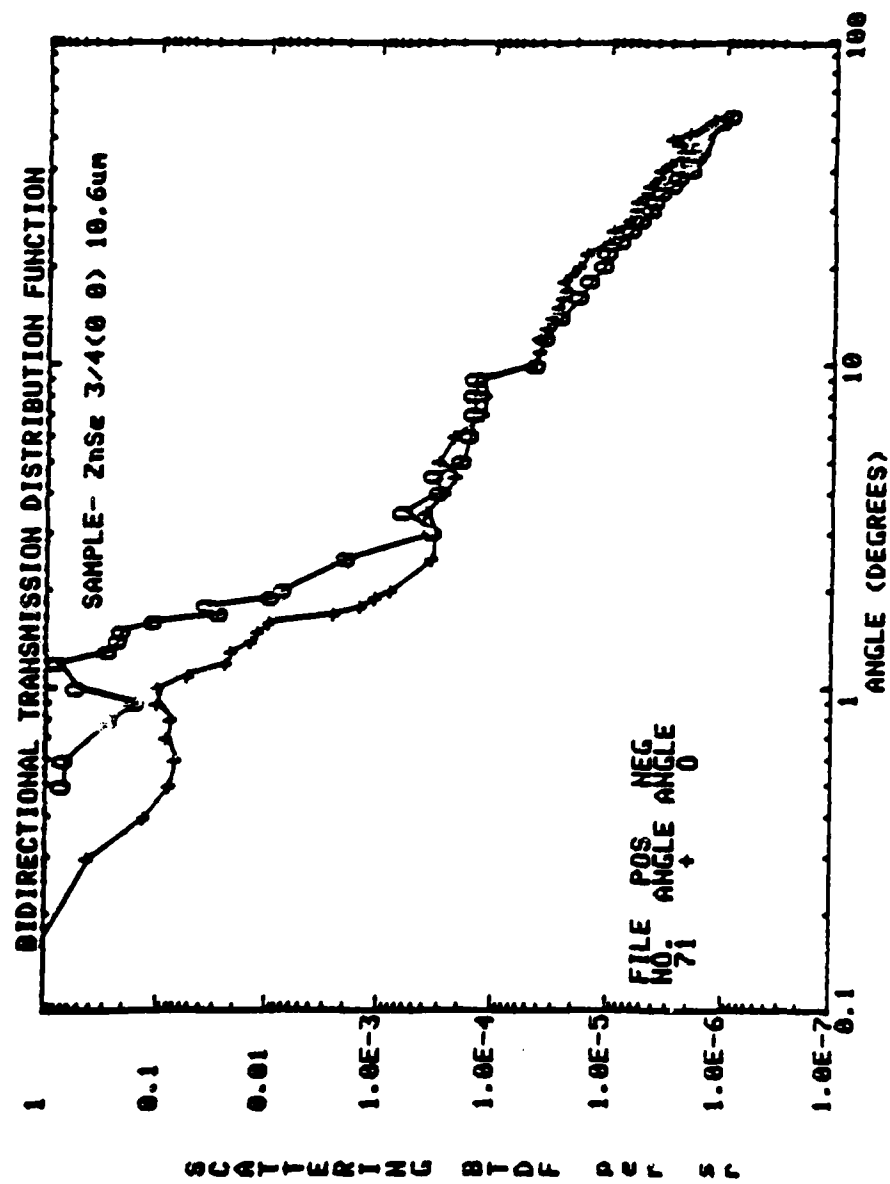
SAMPLE--ZnSe 3/4(15 15) 3.39um

ANGLE	BTDF DATA	ANGLE	BTDF DATA
0	100084.692454	0	110510.181251
0.2	292.332044622	-0.2	465.565848843
0.4	9.20388256582	-0.4	61.5823415313
0.6	2.59382145037	-0.6	2.67749311006
0.8	1.00405991627	-0.8	1.08773157596
1	0.485295626198	-1	0.56000119918
1.2	0.217546315192	-1.2	0.376522468602
1.4	0.125507489534	-1.4	0.23428064713
1.6	0.0920388256582	-1.6	0.125507489534
1.8	0.0552232953949	-1.8	0.0619170281701
2	0.0460194128291	-2	0.0317952306819
2.2	0.0404134116299	-2.2	0.0230933780742
2.4	0.0230933780742	-2.4	0.0157804750174
2.6	0.0153955853828	-2.6	0.0119315786717
2.8	0.0115466890371	-2.8	0.00981468568155
3	0.00962224086427	-3	0.00769779269141
3.5	0.00596578933585	-3.5	0.00500356324942
4	0.00365645152842	-4	0.00346400671114
5	0.0018859592094	-5	0.00192444817285
6	0.00157804750174	-6	0.00127013579408
7	0.00123164683063	-7	0.00103920201334
8	9.622240864E-4	-8	0.082682326E-4
9	0.082682326E-4	-9	6.35067897E-4
10	6.158234153E-4	-10	5.196010067E-4
12	4.23378598E-4	-12	3.464066711E-4
15	3.271561894E-4	-15	2.694227442E-4



SAMPLE--ZnSe 3/4(15 30) 3.39um

ANGLE	BTDF DATA	ANGLE	BTDF DATA
0	114680.37677	0	114680.37677
0.2	140.752465929	-0.2	281.504931859
0.4	8.36716596893	-0.4	32.6319472788
0.6	2.3428064713	-0.6	3.17952306819
0.8	1.00405991627	-0.8	1.08773157596
1	0.54386578798	-1	0.552232953949
1.2	0.184077651316	-1.2	0.359788136664
1.4	0.117140323565	-1.4	0.23428064713
1.6	0.0926388256582	-1.6	0.117140323565
1.8	0.0518764290074	-1.8	0.0585701617825
2	0.0451826962322	-2	0.0301217974881
2.2	0.0327156189385	-2.2	0.0250178262471
2.4	0.0192444817285	-2.4	0.017512478373
2.6	0.0127013579408	-2.6	0.0130862475754
2.8	0.0115466890371	-2.8	0.0101995753161
3	0.00962224086427	-3	0.00808268222599
3.5	0.0051960100667	-3.5	0.00500356524942
4	0.00346400671114	-4	0.00346400671114
5	0.00192444817285	-5	0.00180898128248
6	0.00157864750174	-6	0.00119315786717
7	0.00111617994026	-7	9.23735123E-4
8	9.23735123E-4	-8	7.312903057E-4
9	7.312903057E-4	-9	5.773344519E-4
10	6.158234153E-4	-10	4.811120432E-4
12	4.618675615E-4	-12	3.271561894E-4
15	3.079117077E-4	-15	2.501782625E-4



SAMPLE - ZnS₂ 3/4(0 0) 10.6um

ANGLE
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1.1
1.2
1.3
1.4
1.5
1.6
1.7
1.8
1.9
2
2.5
3
3.5
4
4.5
5
6
7
8

BTDF DATA
17496.5295058
0001.04758984
38.1857759383
0.394839086834
0.124873461721
0.0744032925902
0.0666681075969
0.0791516250625
0.072412858072
0.0971110421571
0.095770788082
0.0511977388697
0.0232438502809
0.0204867546038
0.0134408429084
0.0116194282076
0.0091536921055
0.00240246960904
0.00140352176944
0.00103058124579
7.573355013E-4
3.346475861E-4
3.279879745E-4
3.762705249E-4
2.580616801E-4
2.114441345E-4
2.946899217E-4
2.16439036E-4
1.232038333E-4
1.15545297E-4

ANGLE
9
10
11
12
13
14
15
16
17
18
19
20
22
24
26
28
30
32
34
36
38
40
42
44
46
48
50
52
54
56
57
-60

BTDF DATA
1.245359515E-4
1.727042583E-5
3.889424016E-5
4.014964236E-5
3.47170355E-5
3.123238474E-5
2.755293089E-5
2.50638962E-5
2.313760454E-5
2.447958207E-5
2.12329896E-5
1.776994496E-5
1.534584662E-5
1.002137844E-5
9.025775806E-6
6.493396427E-6
5.71421961E-6
5.606028006E-6
4.632036065E-6
4.415614464E-6
3.636413353E-6
3.549857777E-6
2.965452537E-6
2.359393475E-6
2.359413181E-6
2.424372306E-6
2.900614673E-6
2.013132224E-6
1.536922515E-6
1.121313479E-6
1.270686558E-6
7.381791711E-7

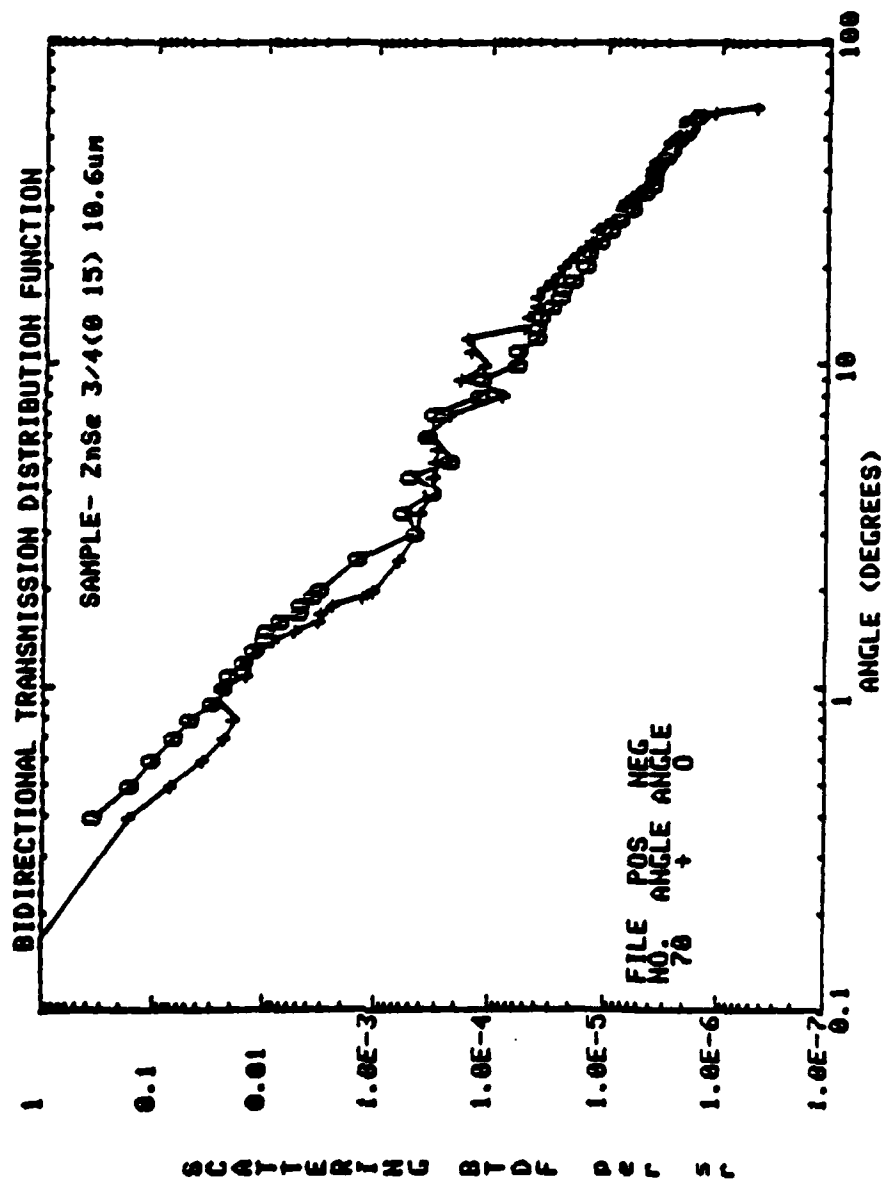
ZnSe 3/4 (0 0) 10.6 μm

ANGLE
-30
-36
-54
-52
-50
-48
-46
-44
-42
-40
-38
-36
-34
-32
-30
-28
-26
-24
-22
-20
-18
-16
-14
-12
-10
-9
-8
-7
-6
-5
-4.5
-4
-3.5

BTDF DATA
0.903607070E-7
1.086600251E-6
1.363740147E-6
1.493614231E-6
1.539057407E-6
1.614005125E-6
1.630601631E-6
1.785779465E-6
1.902740528E-6
1.928611755E-6
2.510856839E-6
2.813871962E-6
3.534633128E-6
3.982660823E-6
4.32895425E-6
5.302940415E-6
6.42843025E-6
7.943511636E-6
1.032435661E-5
1.106022153E-5
1.450160918E-5
1.783475861E-5
2.62326059E-5
3.569097588E-5
4.289834432E-5
1.44847965E-4
1.498426842E-4
1.498424999E-4
1.628287517E-4
1.864704589E-4
3.279881457E-4
2.946897986E-4
6.06020633E-4

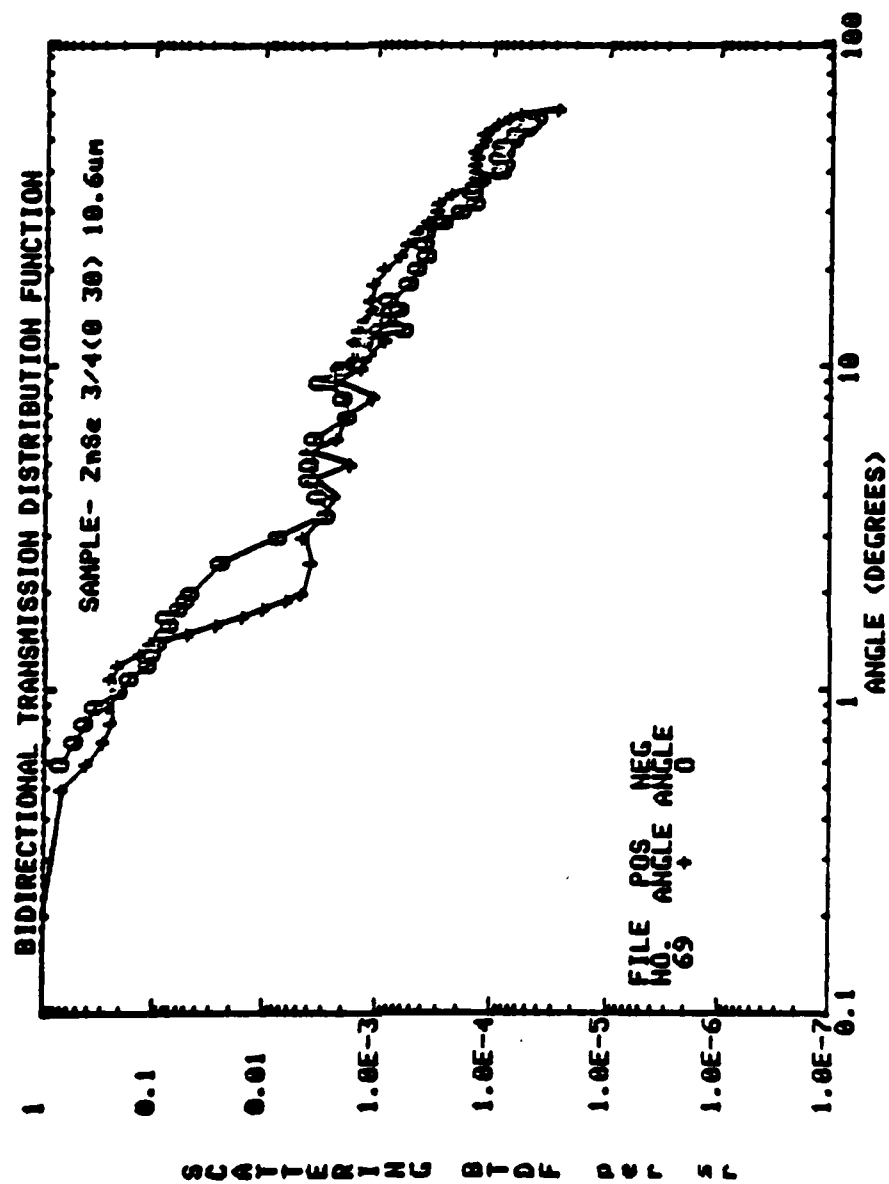
ANGLE
-3
-2.5
-2
-1.9
-1.8
-1.7
-1.6
-1.5
-1.4
-1.3
-1.2
-1.1
-1
-0.9
-0.8
-0.7
-0.6
-0.5
-0.4
-0.3
-0.2
-0.1
0

BTDF DATA
3.329027152E-4
0.00189300649432
0.00716745128173
0.00908543111109
0.0345402870159
0.0270348589823
0.104578185199
0.204216570357
0.219418088505
0.266821465855
0.771986856116
1.40611890149
0.514657893571
0.152329544835
0.263072092097
1.27515680435
0.657107826744
0.677786041609
1.14189715686
11.4878989251
2704.71091664
16749.3565786
1880.3392882



SAMPLE - ZnSe 3/4(0 15) 10.6um

ANGLE	BTDF DATA	ANGLE	BTDF DATA	ANGLE	BTDF DATA
0	15654.7895578	41	3.766326674E-6	-20	1.456659312E-5
0.1	15861.5717449	42	3.203354565E-6	-18	1.878715935E-5
0.2	2743.31025694	44	3.749018086E-6	-17	2.328911365E-5
0.3	1.78521949295	46	2.749041045E-6	-16	2.450114896E-5
0.4	0.159528623591	48	2.554249394E-6	-15	2.839705053E-5
0.5	0.0678551901543	50	2.294516085E-6	-14	3.666504488E-5
0.6	0.0342339392255	52	1.850702851E-6	-13	3.882940266E-5
0.7	0.0220950593426	54	1.733908359E-6	-12	5.692369096E-5
0.8	0.01807429477	56	1.729596655E-6	-11	3.876442555E-5
0.9	0.0255414294632	58	1.437377133E-6	-10	5.804912182E-5
1	0.0224779898457	60	1.097527389E-6	-9	1.180427669E-4
1.1	0.0135174284376	62	4.632613817E-7	-8	1.215390012E-4
1.2	0.0135124338428	64	1.591072579E-6	-7	3.013499165E-4
1.3	0.0107653275309	66	1.922255106E-6	-6	3.446375419E-4
1.4	0.0078983474244	68	1.868118494E-6	-5	2.2143367E-4
1.5	0.0051479111646	70	1.9676744E-6	-4	4.861550179E-4
1.6	0.0031583401098	72	2.294516085E-6	-3	3.130038539E-4
1.7	0.0029602154908	74	2.619187937E-6	-2	5.67735615E-4
1.8	0.0023258836440	76	2.662457075E-6	-1	4.478617519E-4
1.9	0.0012819831328	78	2.922184579E-6	0	0.00141517635899
2	0.0018339110908	80	3.484947872E-6	0.0030917437933	0.0030917437933
2.5	6.076933777E-4	82	3.766312519E-6	0.00363450542739	0.00363450542739
3	4.12020976E-4	84	3.896130409E-6	0.00459682515472	0.00459682515472
3.5	3.995793185E-4	86	4.58075038E-6	0.0047766356953	0.0047766356953
4	3.14668768E-4	88	5.84088237E-6	0.00701261380657	0.00701261380657
4.5	3.063442579E-4	90	7.402471926E-6	0.00929187975738	0.00929187975738
5	3.013495809E-4	92	8.939197621E-6	0.00953495693505	0.00953495693505
5.5	2.847005022E-4	94	1.095208961E-5	0.0119857087682	0.0119857087682
6	3.679463612E-4	96	1.365758705E-5	0.0148110659766	0.0148110659766
7	2.147742499E-4	98		0.0196293239659	0.0196293239659
		100		0.0224396968477	0.0224396968477
				0.028221939302	0.028221939302
				0.0459515968728	0.0459515968728



SAMPLE - ZnS₂ 3/4(0 30) 10.6uH

ANGLE
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1.1
1.2
1.3
1.4
1.5
1.6
1.7
1.8
1.9
2
2.5
3
3.5
4
4.5
5
5.5
6
7

BTDF DATA
223478.880305
185945.575945
89286.747249
2321.9873983
2.8383871103
0.669422342339
0.401124889068
0.282771807999
0.236456450627
0.248696940414
0.213712304521
0.242824818958
0.206847710727
0.129184070448
0.104723780485
0.0463297464521
0.0250059811752
0.0145436716151
0.00965502754871
0.00606990196722
0.00442225448718
0.00371206194802
0.00428561076635
0.00289758824991
0.0022679439404
0.00360418687124
0.00167102265607
0.00403030481841
0.00220321950482
0.00192885205678

ANGLE
0
9
10
11
12
13
14
15
16
17
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19
20
21
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41
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43
44
45
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48
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51
52
53
54
55
56
57
58

BTDF DATA
0.00106140067654
0.00225069033322
0.00134811399543
0.0011589692293
8.430674085E-4
0.00144359054689
0.00118522366496
0.00108399925524
0.00167374699349
0.0015708778472
0.00128608274674
0.00113919873273
0.00105427997158
0.602733966E-4
6.270837541E-4
5.300804924E-4
4.487840035E-4
3.600646624E-4
3.015514625E-4
2.902643714E-4
2.245868736E-4
1.498636463E-4
1.415273524E-4
1.434098981E-4
1.434109893E-4
1.36990695E-4
1.424811795E-4
1.26946418E-4
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1.022988626E-4
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7.146913517E-5

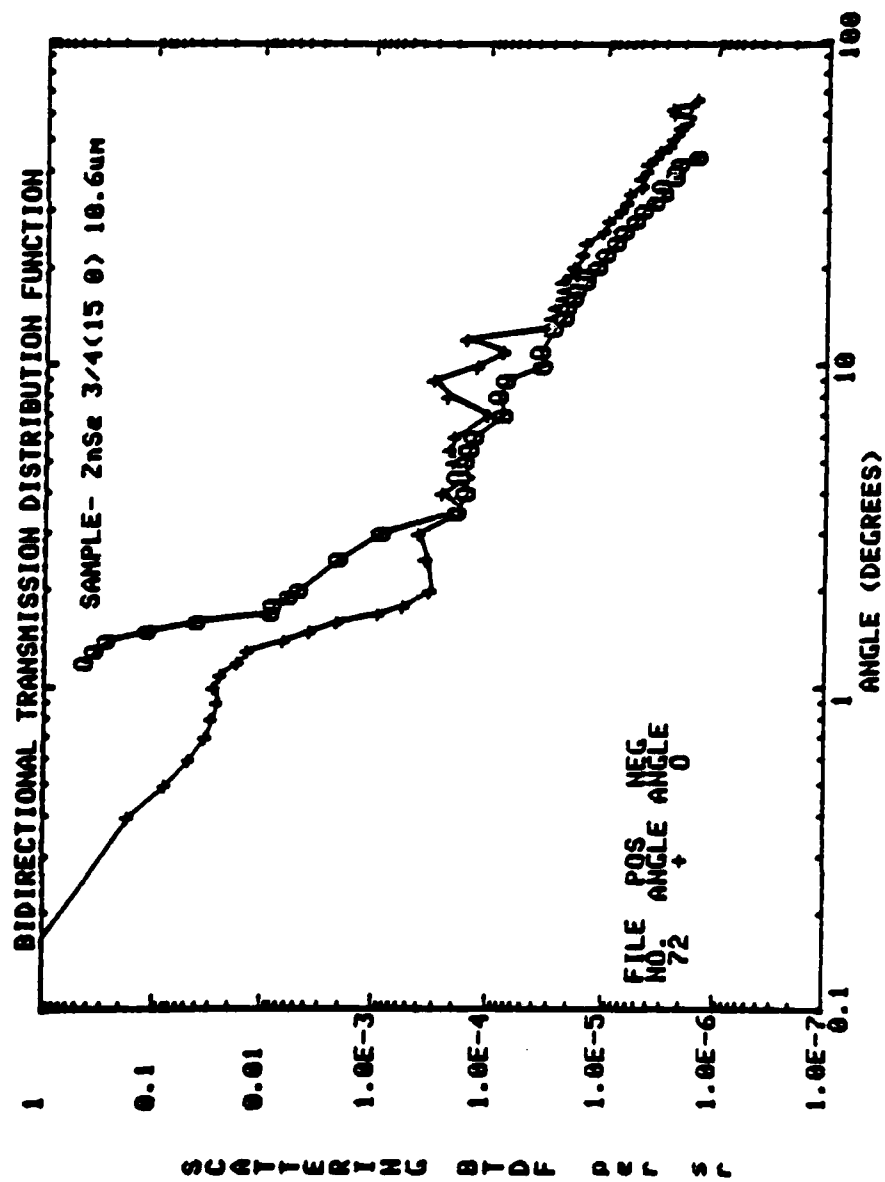
ANGLE
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62
-50
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-54
-52
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-48
-46
-44
-42
-40
-38
-36
-34
-32
-30
-28
-26
-24
-22
-20
-18
-16
-14
-12
-10
-15
-14
-13
-12

BTDF DATA
5.745214649E-5
3.698278896E-5
3.422097853E-5
4.23359679E-5
4.718984566E-5
5.196768409E-5
6.454121248E-5
6.656728545E-5
8.173664523E-5
7.881864132E-5
8.912335665E-5
7.92488989E-5
8.446131817E-5
1.248931987E-4
1.442019006E-4
1.469455118E-4
1.487385792E-4
1.859020751E-4
2.654743293E-4
3.784457414E-4
3.900260113E-4
3.716934093E-4
4.481568714E-4
5.229283893E-4
7.807481254E-4
8.001051909E-4
8.001413807322
8.002025342683
6.288957696E-4
8.094113918E-4
5.854551674E-4
8.001297485955

ZnSe 3/4 (0 30) 10.6 μ m

ANGLE
-11
-10
-9
-8
-7
-6
-5
-4.5
-4
-3.5
-3
-2.5
-2
-1.9
-1.8
-1.7
-1.6
-1.5
-1.4
-1.3
-1.2
-1.1
-1
-0.9
-0.8
-0.7
-0.6
-0.5
-0.4
-0.3
-0.2
-0.1
0

BTDF DATA
0.00131280324613
0.00190257837568
0.00322446720211
0.00196409345007
0.00176847397749
0.0035297539839
0.00382066187233
0.00381778429732
0.00328954354952
0.00274368309094
0.00734285717812
0.0233230977379
0.044233326125
0.0488972316856
0.0562185105015
0.0746475655974
0.0677362190678
0.0752085258495
0.0893476555888
0.0996679252599
0.109204285713
0.16032738091
0.202025587102
0.340996835826
0.420394592004
0.514762133075
0.687708371257
1.2424094918
2.00865886691
4.84690223119
435.595942461
44586.4124323
223127.545232



SAMPLE - ZnSe 3/4(15 0) 10.6um

ANGLE
0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 2 2.5 3 3.5 4 4.5 5 5.5 6 7 8

BTDF DATA
17677.8672278
15059.8396562
6843.13400874
41.8023642745
0.165171993001
0.075012275259
0.0455186392883
0.0322026251392
0.0280056007306
0.0250293289158
0.0272043510278
0.0237704219572
0.0161013132793
0.0129195373247
0.0061346237320
0.0035616650432
0.0020387919893
0.008775939E-4
5.374846423E-4
3.135327191E-4
3.450519173E-4
3.997957821E-4
1.725260067E-4
2.471767257E-4
1.486378455E-4
1.99068587E-4
2.139987832E-4
1.957500771E-4
9.953440434E-5
2.206347498E-4

ANGLE
9 10 11 12 13 14 15 16 17 18 19 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62

BTDF DATA
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1.227593892E-4
7.299214034E-5
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3.219790016E-5
2.833763818E-5
2.652613536E-5
2.311874635E-5
2.294625352E-5
2.33577049E-5
2.04877948E-5
1.846061482E-5
1.580804136E-5
1.447099731E-5
1.017934787E-5
9.230471862E-6
7.31109066E-6
6.405328669E-6
5.974029992E-6
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4.852616281E-6
4.162496538E-6
4.20566322E-6
3.493963481E-6
3.235178391E-6
2.652869422E-6
2.523484106E-6
2.221549771E-6
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2.480502311E-6

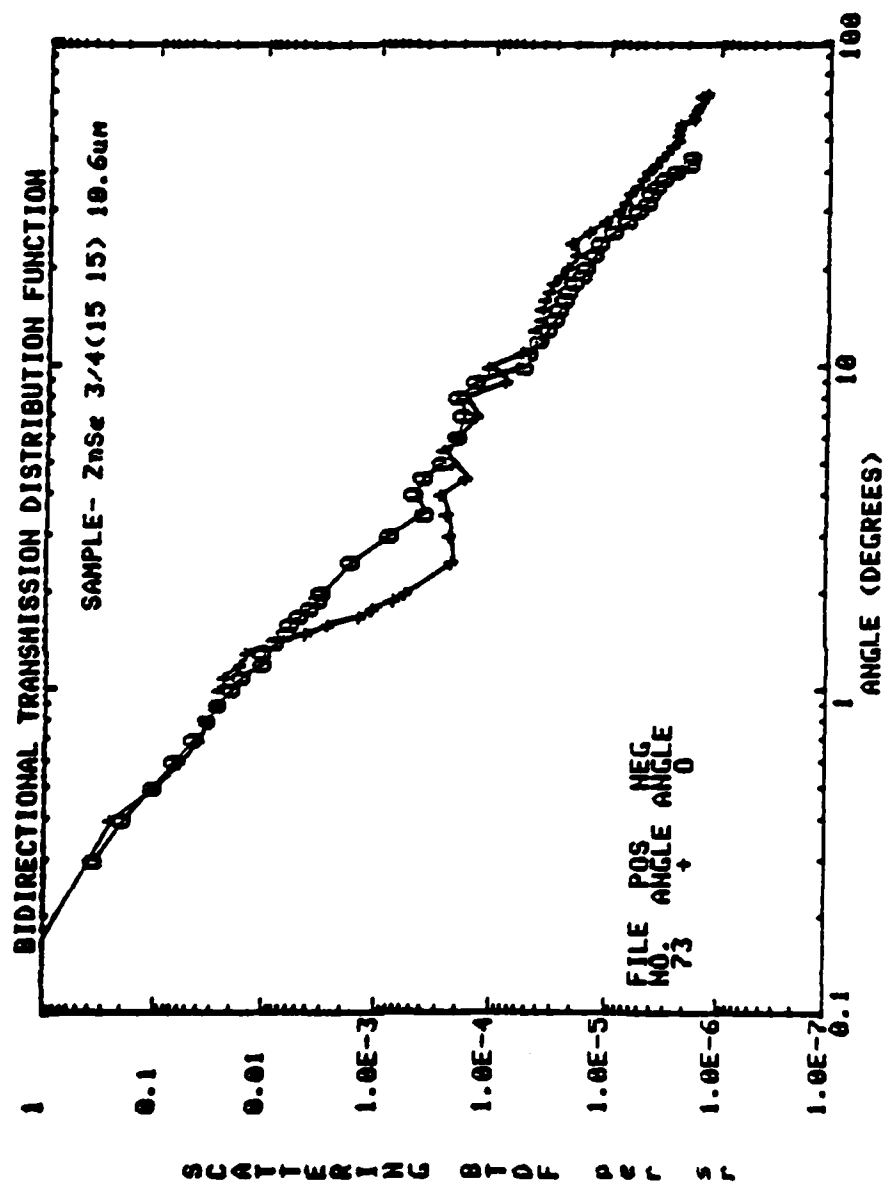
ZnSe 3/4 (15 0) 10.6 μ m

ANGLE
64
66
-15
-14
-12
-10
-36
-34
-32
-30
-28
-26
-24
-22
-20
-19
-18
-17
-16
-15
-14
-13
-11
-10
-9
-8
-7
-6
-5.5
-5
-4.5

BTDF DATA
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1.505592824E-6
1.376023399E-6
1.46228842E-6
2.111458611E-6
2.329272674E-6
2.350822998E-6
3.084086058E-6
2.976231549E-6
3.601649453E-6
4.528994214E-6
5.348497715E-6
6.599322983E-6
7.979536519E-6
9.791065178E-6
1.153788426E-5
1.447085296E-5
1.475118693E-5
1.751161453E-5
1.850988745E-5
2.132873811E-5
2.236387427E-5
2.743183456E-5
3.588559045E-5
3.359957659E-5
6.967418648E-5
8.128648678E-5
7.415313123E-5
1.335419119E-4
1.45817755E-4
1.582595267E-4
1.89115116E-4

ANGLE
-4
-3.5
-3
-2.5
-2
-1.9
-1.8
-1.7
-1.6
-1.5
-1.4
-1.3
-1.2
-1.1
-1
-0.9
-0.8
-0.7
-0.6
-0.5
-0.4
-0.3
-0.2
-0.1
0

BTDF DATA
1.561028831E-4
1.099444977E-4
0.427230594E-4
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0.004533378265185
0.00566183677672
0.00780182182941
0.00814189685668
0.0388415586967
0.111869792201
0.26109310291
0.336563237165
0.422640396195
7.99189820731
11.4500938654
12.3941953857
9.93550194857
70.6931562296
535.006169405
529.878165761
548.833452559
438.032003302
7702.98986772
17111.955713
16947.1271062



SAMPLE - ZnSe 3/4(15 15) 10.6um

ANGLE
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1.1
1.2
1.3
1.4
1.5
1.6
1.7
1.8
1.9
2
2.5
3
3.5
4
4.5
5
5.5
6
7

BTDF DATA
17626.1130051
15362.5374175
4609.86406995
7.27073275091
0.244271024936
0.0959239567362
0.0553333805155
0.0372973792022
0.0322427038057
0.0260392384333
0.0249670347179
0.0227077480552
0.0162745244965
0.0139902640338
0.0079016772505
0.0040324194180
0.0026205731855
0.0013835427894
0.0010605496644
6.99263527E-4
5.477564394E-4
2.214334773E-4
2.330879006E-4
2.49737074E-4
2.780406575E-4
1.698212734E-4
2.197687552E-4
2.697162652E-4
2.01454795E-4
1.376806083E-4

ANGLE
0
9
10
11
12
13
14
15
16
17
18
19
20
22
24
26
28
30
32
34
36
38
40
42
44
46
48
50
52
54
56
58
60

BTDF DATA
1.701462072E-4
7.600680459E-5
1.002198393E-4
5.638259123E-5
3.703290462E-5
4.389410736E-5
3.874287505E-5
3.011524847E-5
3.569116134E-5
3.246623649E-5
3.047502348E-5
2.610294134E-5
2.209963674E-5
1.86574327E-5
2.051093469E-5
1.470322512E-5
1.051930221E-5
0.160078761E-6
7.034591128E-6
6.363638332E-6
5.541163249E-6
4.978423042E-6
4.502258643E-6
3.852923734E-6
3.44168406E-6
3.030438947E-6
2.770711207E-6
2.402747976E-6
2.402770719E-6
2.337853967E-6
2.272936781E-6
1.684155737E-6
1.716645404E-6

AD-A124 458

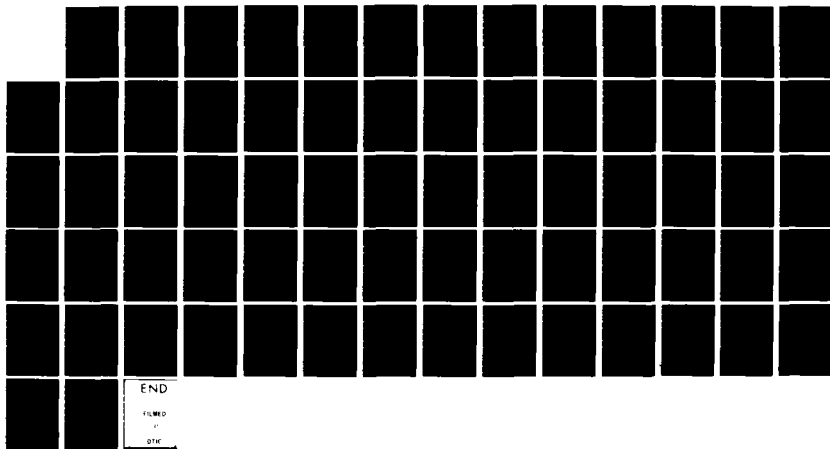
SCATTERING MEASUREMENTS OF RAYTRAN ZINC ELENIDE IN
TRANSMISSION AT WAVELENGTH (U) ARIZONA UNIV TUCSON OPTICAL
SCIENCES CENTER F O BARELL ET AL. AUG 81
AMMRC-TR-81-38 DAAG46-79-A-8871

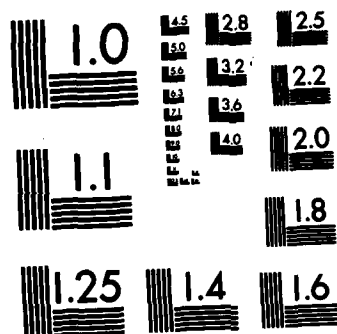
2/2

UNCLASSIFIED

F/G 20/6

NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

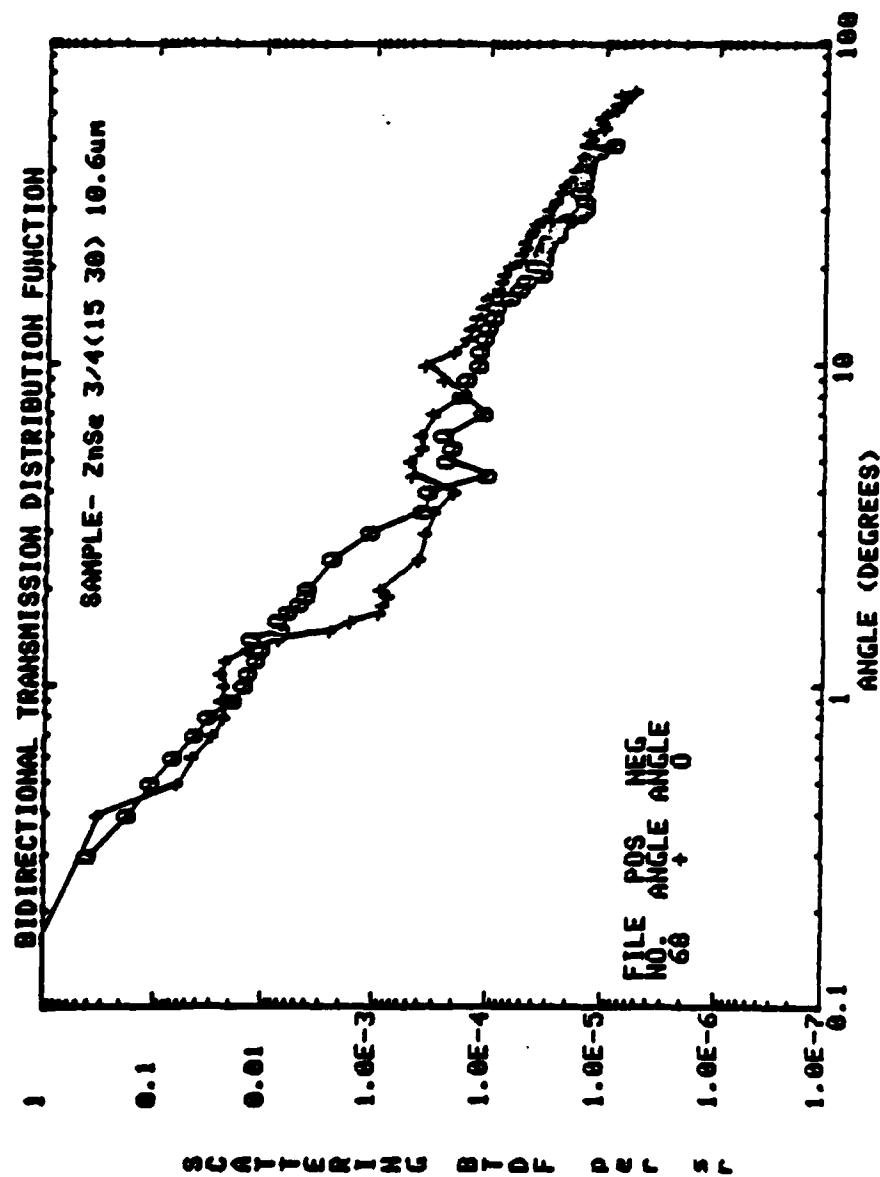
ZnSe 3/4 (15 15) 10.6 μ m

ANGLE
62
64
66
68
69
-13
-14
-12
-10
-38
-36
-34
-32
-30
-28
-26
-24
-22
-20
-19
-18
-17
-16
-15
-14
-13
-12
-11
-10
-9
-8
-7

BTDF DATA
1.618590972E-6
1.521853082E-6
1.41363023E-6
1.446120577E-6
1.311908145E-6
1.552011108E-6
1.805260696E-6
1.855031258E-6
2.506545918E-6
3.160216366E-6
3.744614227E-6
4.199135490E-6
4.523703217E-6
5.389548041E-6
6.6016197E-6
8.874263902E-6
1.177457856E-5
1.324634433E-5
1.564880658E-5
1.683921091E-5
1.947977353E-5
2.231512655E-5
2.357045161E-5
2.65356585E-5
2.973894431E-5
3.393705026E-5
3.939210194E-5
4.872061914E-5
5.380690412E-5
1.40852159E-4
2.004561061E-4
1.031408332E-4

ANGLE
-6
-5
-4.5
-4
-3.5
-3
-2.5
-2
-1.9
-1.8
-1.7
-1.6
-1.5
-1.4
-1.3
-1.2
-1.1
-1
-0.9
-0.8
-0.7
-0.6
-0.5
-0.4
-0.3
-0.2
-0.1
0

BTDF DATA
2.06449542E-4
2.76375050E-4
3.979145523E-4
4.728356091E-4
3.929196632E-4
7.675251585E-4
0.00165159405661
0.00299184900192
0.00322826661645
0.00380765633062
0.00458350577524
0.005664034293
0.00602199051826
0.00764528064357
0.00999447280672
0.0102591938565
0.0153654818389
0.0191464990160
0.0259626524379
0.0322809960031
0.0418925388575
0.0646768717582
0.101323269271
0.108171785003
0.346035494577
24.5909963819
179.211222566
14196.2859163



ZnSe 3/4 (15 30) 10.6 μ m

ANGLE

7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
32
34
36
38
40
42
44
46
48

BTDF DATA

2.969116791E-4
1.679635967E-4
2.388385975E-4
3.584191788E-4
1.98277397E-4
1.519263318E-4
1.416298329E-4
1.248925405E-4
1.109891313E-4
1.021947667E-4
8.179851421E-5
7.68093021E-5
7.285786599E-5
6.619886198E-5
5.291395335E-5
5.19028725E-5
4.672732283E-5
4.779183076E-5
4.240337163E-5
4.116689422E-5
3.909058895E-5
3.285054813E-5
3.092137536E-5
3.056221757E-5
2.623017001E-5
2.307029102E-5
2.194878555E-5
1.753280391E-5
1.760212049E-5
1.451264563E-5
1.587693225E-5
1.187429769E-5
1.437196415E-5

ANGLE

0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1.1
1.3
1.4
1.5
1.6
1.7
1.8
1.9
2
2.5
2.5
3
3.5
4
4.5
5
5.5
6
7

BTDF DATA

19489.5437551
16465.5098826
8250.91697488
349.842215179
0.314789125655
0.0580586507463
0.0416667872849
0.0274828771304
0.0221897562004
0.0234055201425
0.022189756571
0.0234386025848
0.0215694693696
0.0133899429887
0.00685444843696
0.00233695630003
0.00158649812956
0.791903867E-4
0.27050275E-4
7.360747573E-4
0.651385768E-4
4.010115632E-4
3.498783185E-4
2.922365389E-4
1.974493804E-4
4.548060927E-4
4.017833334E-4
3.817740771E-4
3.879958448E-4
2.969116791E-4

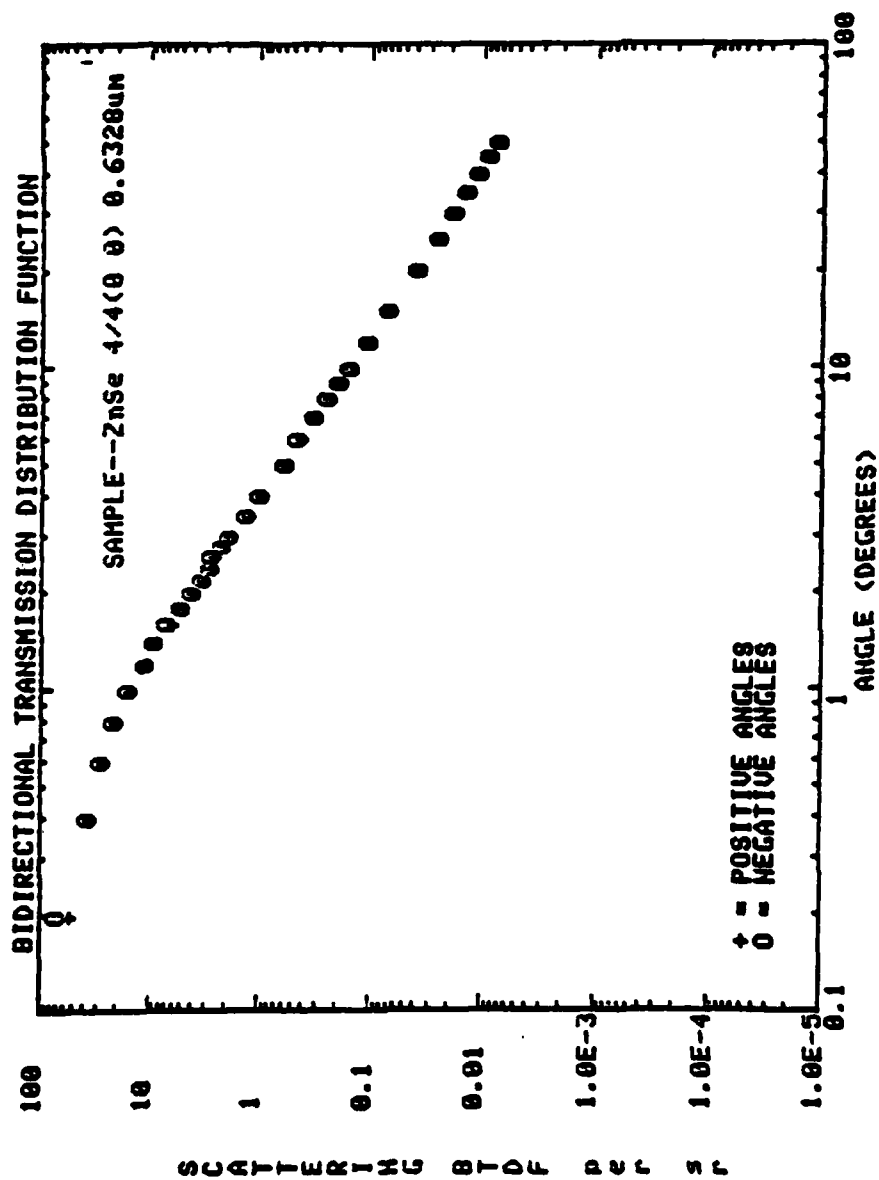
ZnSe 3/4 (15 30) 10.6 μ m

ANGLE
30
32
34
36
38
40
42
44
46
48
50
52
54
56
58
60
62
64
66
68
70
72
74
76
78
80
82
84
86
88
90
92
94
96
98
100

BTDF DATA
1.253183866E-5
1.312009968E-5
9.79759069E-6
1.025677033E-5
1.037664001E-5
9.533093498E-6
7.74685884E-6
7.984349167E-6
6.563214197E-6
7.263274243E-6
5.480129424E-6
6.372369434E-6
0.035651170E-5
1.094287586E-5
1.308902855E-5
1.40070249E-5
1.426371847E-5
1.470403096E-5
1.500463474E-5
1.605566652E-5
1.465983677E-5
1.47794999E-5
1.638007969E-5
1.996312775E-5
2.359405766E-5
2.583361547E-5
2.476878463E-5
3.057639373E-5
3.184961999E-5
3.31414708E-5
3.34287925E-5
3.084651137E-5

ANGLE
-19
-18
-17
-16
-15
-14
-13
-12
-11
-10
-9
-8
-7
-6
-5
-4
-3
-2
-1
0
1
2
3
4
5
6
7
8
9
10
11
12
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14
15
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18
19

BTDF DATA
3.387438401E-5
4.696769743E-5
5.21804803E-5
6.355607096E-5
8.415323131E-5
8.895616561E-5
1.002518499E-4
1.076091216E-4
1.169491437E-4
1.191842331E-4
1.535981737E-4
1.720053669E-4
1.097462086E-4
2.390178928E-4
2.037422926E-4
2.299202086E-4
1.021228102E-4
3.25354579E-4
3.674981454E-4
0.0010629037222
0.00228517618755
0.00384182845619
0.00394610864052
0.00449088299302
0.00576166362629
0.00714643332433
0.00660777180633
0.0124046746265
0.0101072728073
0.0111446813179
0.0131716733558
0.0142583452585
0.018046234965

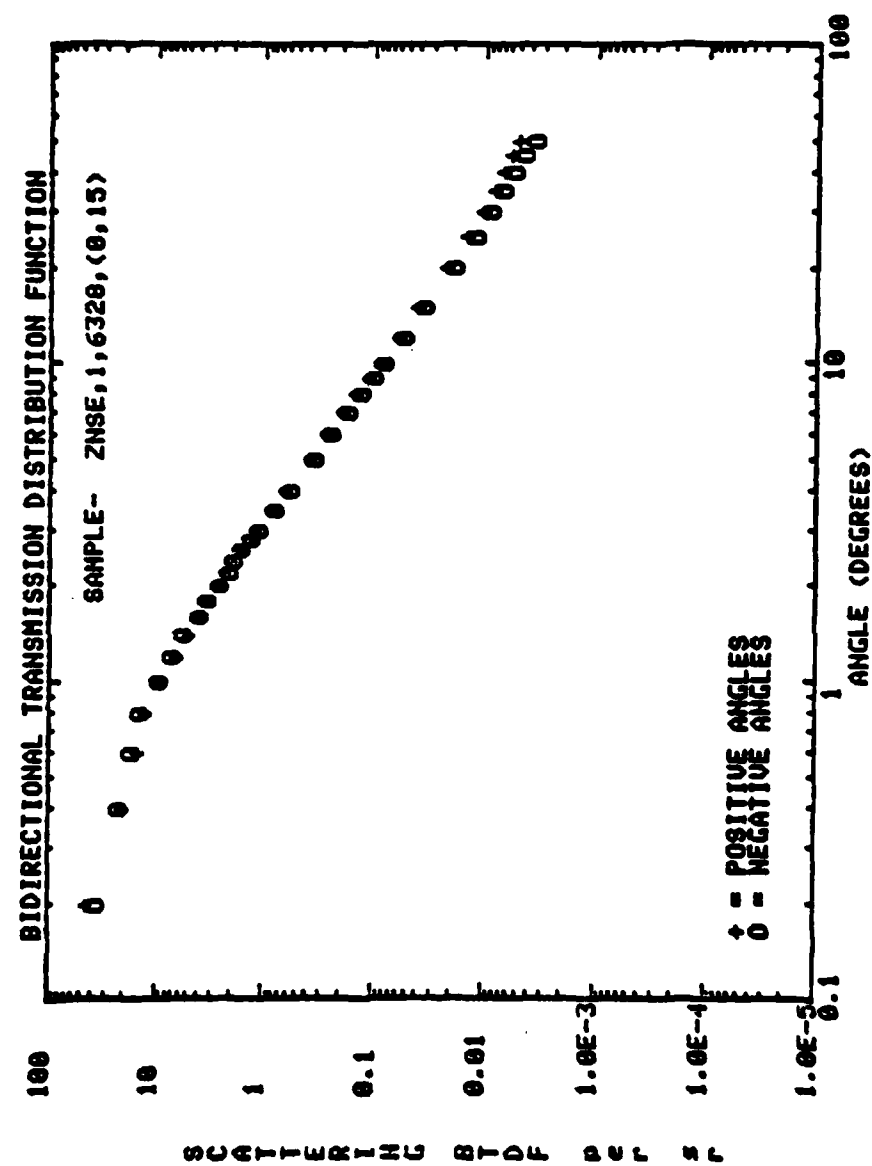


SAMPLE--ZnSe 4/4(0 0) 0.6328um 2/6/88

ANGLE
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3
3.5
4
5
6
7
8
9
10
12
15
20
25
30
35
40
45
50

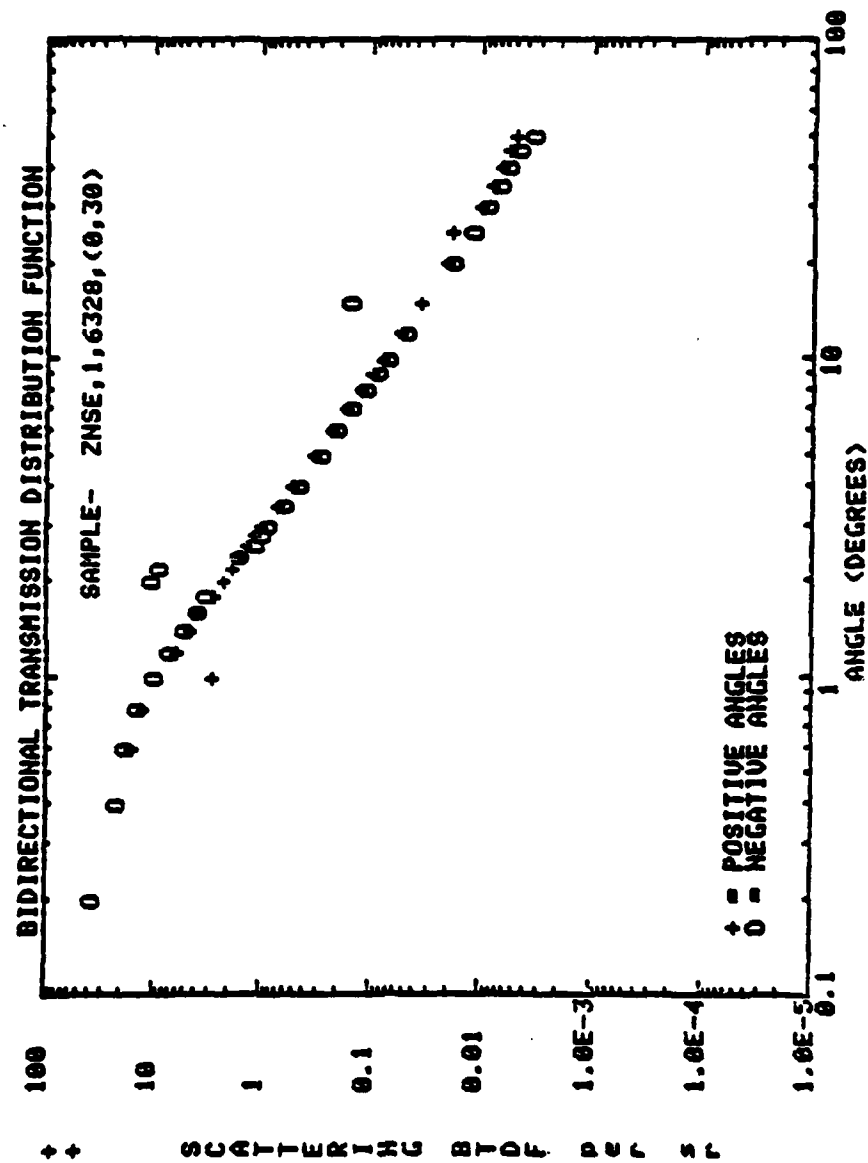
BTDF DATA
166666.666667
50.7443366638
32.7723842778
24.8435818605
19.55377136336
14.2718453224
10.6436540732
8.77382316391
5.02524341033
4.96224454313
3.77562098117
3.02049690265
2.66091405163
2.3832585684
2.08466811502
1.71296727406
1.19162958773
0.887515941106
0.546163884123
0.407796438645
0.301935242334
0.225531054431
0.177663378925
0.143683686758
0.098497601608
0.065141996094
0.0376511841781
0.024702622098
0.0179295512551
0.014605182887
0.011136605195
0.003935166344
0.0073110153561

BTDF DATA
166666.666667
68.1942281354
35.4022669668
27.0819187604
20.7192995618
15.1724007199
10.720897809
8.82309934136
6.7921219462
5.02750218742
3.92877668234
3.15629301868
2.73016706999
2.61473439579
2.11477429861
1.80445425408
1.27576084334
0.94820079178
0.580414060358
0.439810555202
0.32048230329
0.24121424189
0.188368867504
0.150865696558
0.103986737592
0.0682482120141
0.0383668739427
0.0249018367927
0.0177031987708
0.0137978462673
0.0108035173011
0.00878077354838
0.00715759501084



SAMPLE--ZnSe 4/4(0 15) 0.6320um

ANGLE	BTDF DATA	BTDF DATA	BTDF DATA
0	93247.5884244	0	98070.7395498
0.2	42.0900322325	-0.2	33.9514112813
0.4	19.9214086481	-0.4	21.3183281325
0.6	14.3944268213	-0.6	16.2165061658
0.8	12.1471957876	-0.8	13.787067219
1	8.89960741541	-1	9.66752453645
1.2	6.27170455908	-1.2	6.85101867851
1.4	4.90310015291	-1.4	5.3145771178
1.6	3.90407334607	-1.6	3.76134378365
1.8	3.14844634681	-1.8	3.19342563143
2	2.57234774427	-2	2.48303011426
2.2	2.17935025716	-2.2	1.98285146348
2.4	1.87567038336	-2.4	1.80421627351
2.6	1.56334454177	-2.6	1.53328022366
2.8	1.31948958321	-2.8	1.25267998406
3	1.13242276653	-3	1.06561316379
3.5	0.810417757037	-3.5	0.754948624859
4	0.681286619989	-4	0.554519882879
5	0.364112605256	-5	0.337368744319
6	0.251666193836	-6	0.234580599025
7	0.181015059608	-7	0.167623639382
8	0.135684936053	-8	0.126525920535
9	0.10620797327	-9	0.0969724973335
10	0.0845046793121	-10	0.0775703562537
12	0.0581836684679	-12	0.0521005915625
15	0.0374334025593	-15	0.0338963881443
20	0.021222580008	-20	0.0184712252525
25	0.0138535635593	-25	0.011790266059
30	0.00992360122241	-30	0.00854805253812
35	0.00789969870606	-35	0.00670690820656
40	0.006552424279602	-40	0.00525673177089
45	0.00551230700739	-45	0.00425459764812
50	0.00476529958643	-50	0.00333605103954



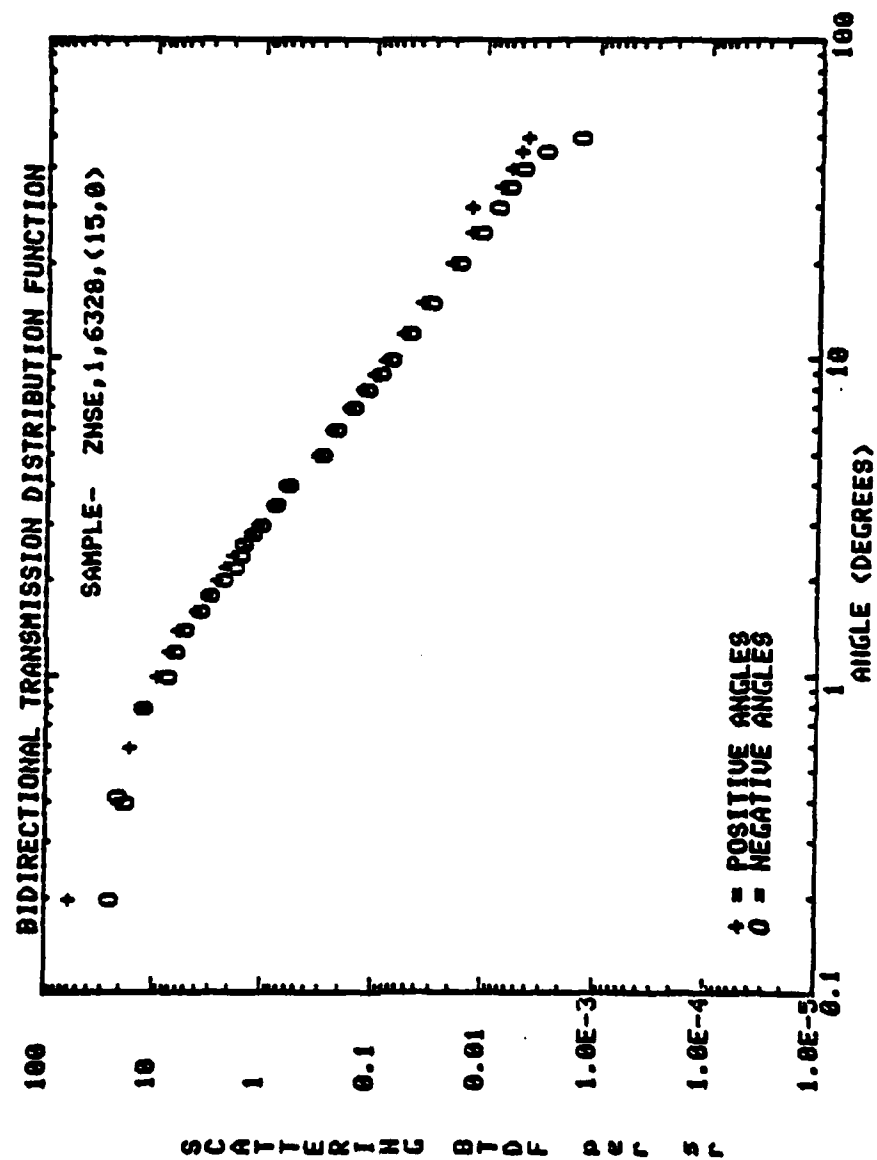
SAMPLE--ZnSe 4/4(0 30) 0.6328um

ANGLE
0 0.2 0.4 0.6 0.8 1 1.2 1.4 1.6 1.8 2 2.2 2.4 2.6 2.8 3 3.5 4 5 6 7 8 9 10 12 15 20 25 30 35 40 45 50

BTDF DATA
101022.079314
376.563058934
217.434799756
15.3662024717
12.2079317666
2.68667393673
5.84351593167
4.3406577236
3.4590929439
2.56073636207
2.05430549021
1.73276208971
1.55769999456
1.29610615856
1.09557742606
0.945355878047
0.668096128194
0.497731702102
0.310664803383
0.216109685716
0.156541084712
0.119137545614
0.0951254021462
0.0757309694382
0.052642366709
0.0345841409472
0.0197484508285
0.0170819047361
0.00962884079086
0.00766388600516
0.00533755512566
0.00340422334057
0.00474599527772

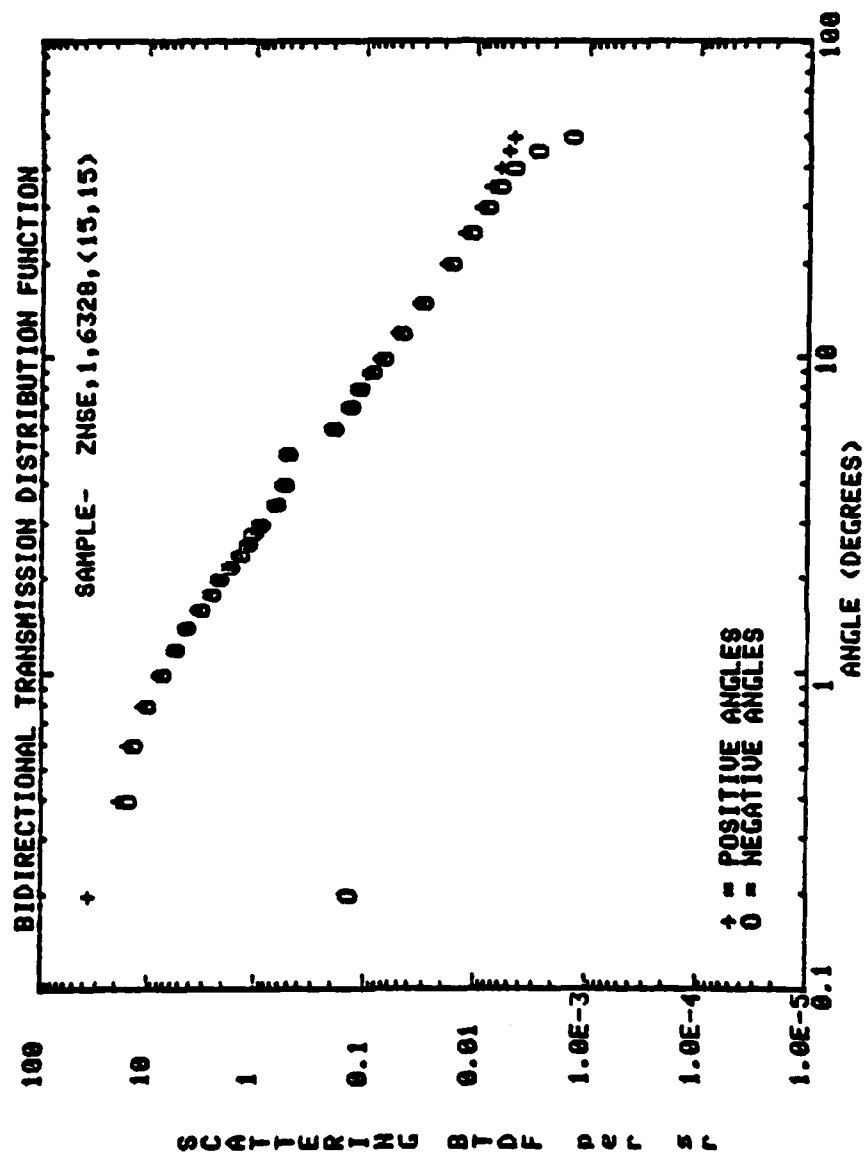
ANGLE
0 -0.2 -0.4 -0.6 -0.8 -1 -1.2 -1.4 -1.6 -1.8 -2 -2.2 -2.4 -2.6 -2.8 -3 -3.5 -4 -5 -6 -7 -8 -9 -10 -12 -15 -20 -25 -30 -35 -40 -45 -50

BTDF DATA
1039657.02036
35.1661308262
21.0753842222
17.7349056195
13.6655952611
9.57127589959
6.05941453473
4.81922150865
3.69417693037
3.10646706219
10.075028665
8.47981612356
1.51839983415
1.09557737115
0.928653428181
0.808396193219
0.591265073451
0.430922077659
0.273919574596
0.195329908244
0.143149664486
0.108516756664
0.084956378616
0.0603425821759
0.0466392898036
0.147306825347
0.017506964691
0.0114955101875
0.00835154558322
0.00661255874343
0.00552202477615
0.00443146313927
0.00327200370079



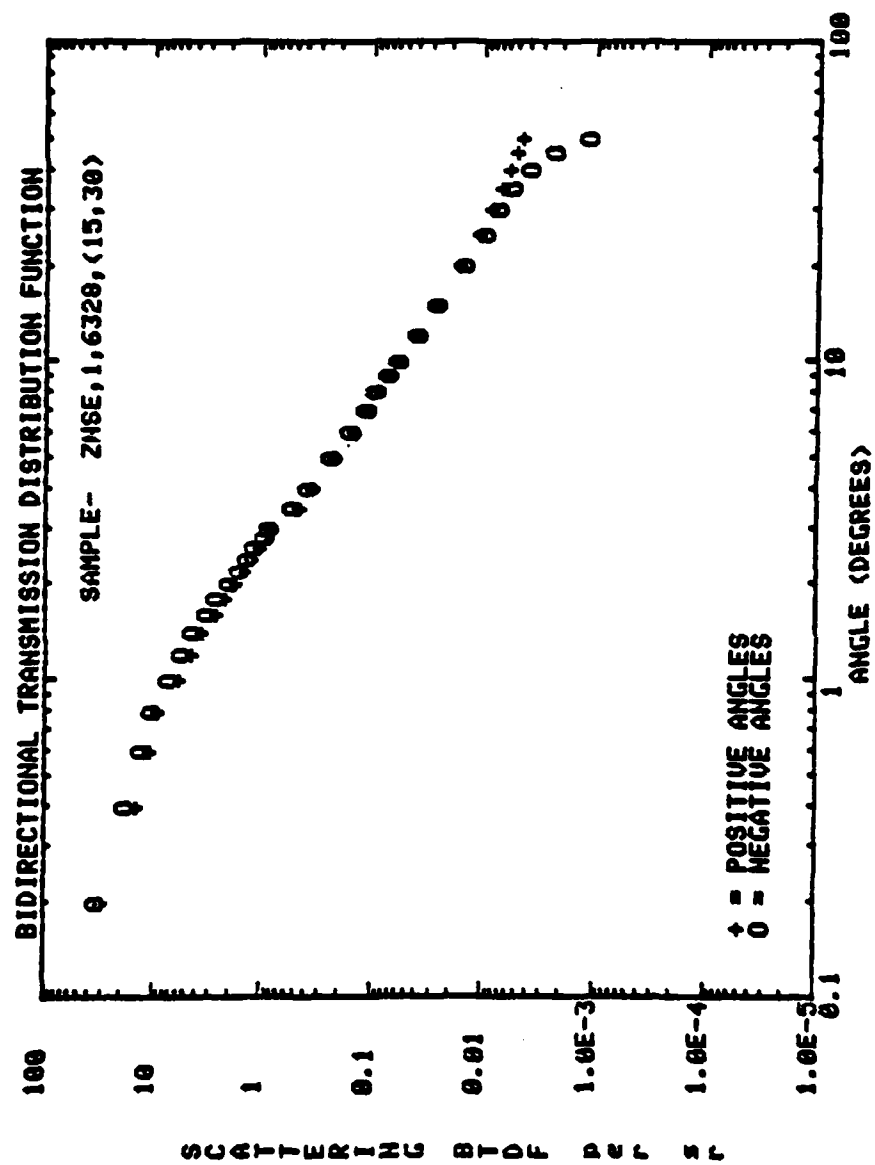
SAMPLE--ZnSe 4/4(15 0) 0.6320um

SAMPLE-ZNSE,1,6320,(15,0)		BTDF DATA	
ANGLE		BTDF DATA	
0	94527.3631841	0	89552.238806
0.2	56.3847430563	-0.2	24.1326700282
0.4	20.3548923567	-0.4	17.3101162147
0.6	15.9568825219	-0.6	23217.2474856
0.8	12.4610285624	-0.8	12.06633535
1	9.134328782	-1	7.21724743269
1.2	7.00713147976	-1.2	6.09739675827
1.4	5.65650134448	-1.4	4.98039103008
1.6	3.88159250083	-1.6	3.55422927787
1.8	3.10215635355	-1.8	2.89176856073
2	2.50159051408	-2	2.17462726925
2.2	2.16683299072	-2.2	1.74593737382
2.4	1.79270362999	-2.4	1.5276952673
2.6	1.44444489747	-2.6	1.42706114435
2.8	1.23548966997	-2.8	1.1791049065
3	1.07794406537	-3	1.6015879305
3.5	0.774461468357	-3.5	0.741293953652
4	0.595356992534	-4	0.582069984344
5	0.310116445939	-5	0.28474328218
6	0.235622284096	-6	0.212272328014
7	0.167695240276	-7	0.151562533617
8	0.12651447185	-8	0.112504480031
9	0.0997682024644	-9	0.0866072906499
10	0.0793903864133	-10	0.0696255383304
12	0.0543419882661	-12	0.0462755993829
15	0.0356637222127	-15	0.0300998167012
20	0.0190842827629	-20	0.016506397546
25	0.0133171357462	-25	0.0105807379902
30	0.0131348768182	-30	0.00757079705494
35	0.03720504802587	-35	0.00591990527695
40	0.00581966915610	-40	0.00453350402919
45	0.0048437386523	-45	0.00289164812199
50	0.00420529704860	-50	0.00136831791172



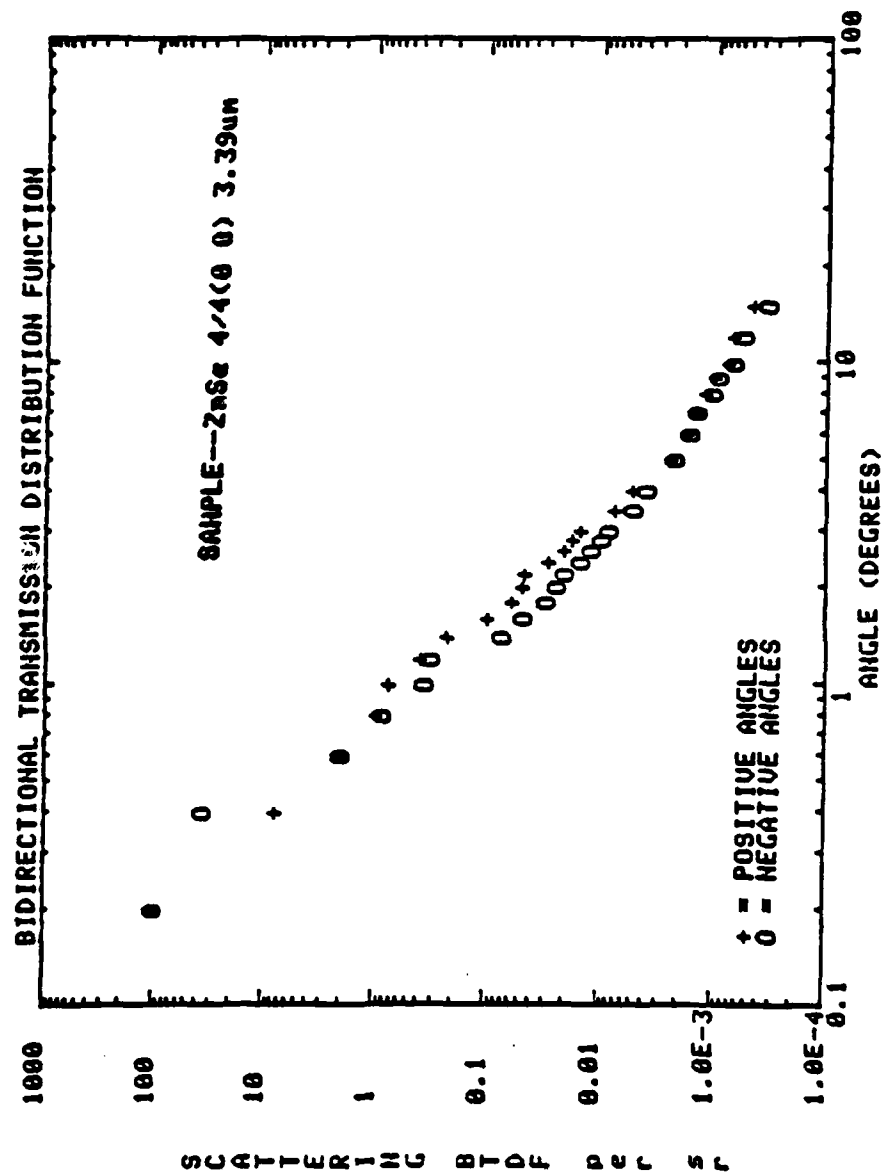
SAMPLE--ZnSe 4/4(15 15) 0.6328um

SAMPLE-ZNSE,1,6328,<15,15>		BTDF DATA	
ANGLE			
0	92039.800995	0	87064.6766169
0.2	33.6053068617	-0.2	0.133913764759
0.4	18.1558873653	-0.4	14.5472637896
0.6	15.1111113635	-0.6	13.0248758394
0.8	11.0514099467	-0.8	9.9237150542
1	7.6930351028	-1	6.99154261294
1.2	5.50281960479	-1.2	5.34393236386
1.4	4.30248795344	-1.4	4.18557251992
1.6	3.30480967942	-1.6	3.04755571852
1.8	2.50978478855	-1.8	2.40845807349
2	2.07338055061	-2	2.01094564683
2.2	1.6212275614	-2.2	1.61343319813
2.4	1.40298544956	-2.4	1.30165872265
2.6	1.15920434367	-2.6	1.11940333616
2.8	0.987131341572	-2.8	1.00829224072
3	0.83250449356	-3	0.855721750353
3.5	0.605307143363	-3.5	0.62023252498
4	0.504146311227	-4	0.52736357556
5	0.474295740847	-5	0.482587624429
6	0.193963839723	-6	0.104942265782
7	0.140398329131	-7	0.131940598461
8	0.114627206038	-8	0.108683573133
9	0.0900036549891	-9	0.0844845629379
10	0.0730218976636	-10	0.0670782548305
12	0.0496719736495	-12	0.0454265058162
15	0.0324354961416	-15	0.0292089284626
20	0.0185529147914	-20	0.016217879749
25	0.012225766438	-25	0.0106719512487
30	0.00893901339010	-30	0.00775322589964
35	0.00717868328653	-35	0.00602024265453
40	0.00590176400259	-40	0.00446053012128
45	0.00503529093798	-45	0.00271833167304
50	0.00445903851161	-50	0.00132270731466



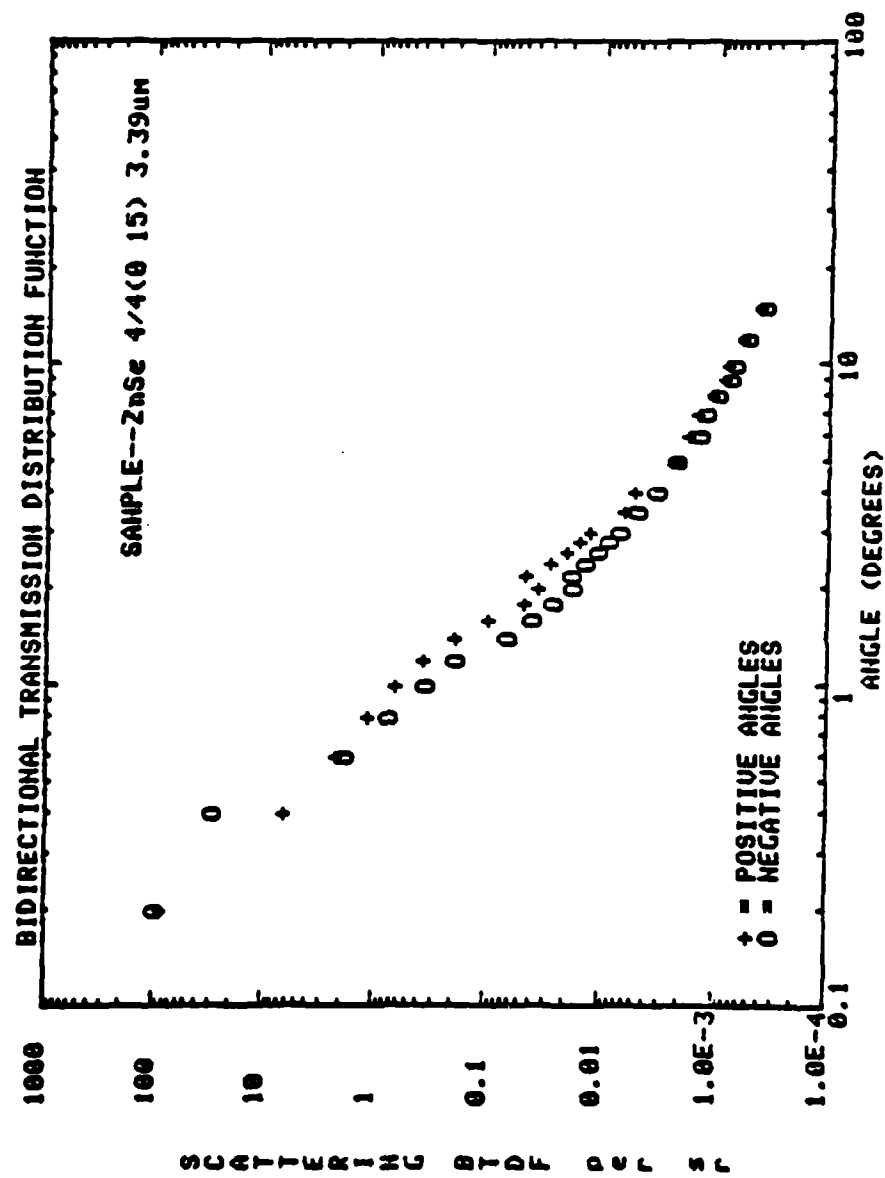
SAMPLE--ZnSe 4/4(15 30) 0.6328um

SAMPLE-ZNSE, 1.6328, (15, 30)		BTDF DATA	
ANGLE		BTDF DATA	
0	07064.6766169	08323.3532934	
0.2	28.1923715283	31.896207644	
0.4	13.6451078957	17.5316035899	
0.6	10.3747928764	12.4963336868	
0.8	8.6268659278	10.0399803372	
1	5.43267023547	6.91084529735	
1.2	4.23233859122	5.33948804802	
1.4	3.32039831189	4.06520329715	
1.6	2.45522417221	3.02544946114	
1.8	2.01873993862	2.53293451249	
2	1.65799367605	1.89970095136	
2.2	1.35621921002	1.52445144613	
2.4	1.1691545113	1.26646740432	
2.6	0.98339168646	1.10778477858	
2.8	0.825870947172	0.896540578939	
3	0.781094853519	0.81670027449	
3.5	0.436982006236	0.503326966039	
4	0.324212512647	0.356287689634	
5	0.206650322612	0.223386819319	
6	0.141525941193	0.149584414847	
7	0.103748162892	0.107169238981	
8	0.0870317675476	0.0902730558088	
9	0.068776377869	0.0702597450786	
10	0.0560460609977	0.0562078456114	
12	0.0394820508496	0.0383236093335	
15	0.0267040930276	0.0251233494231	
20	0.0158782382083	0.0143502330491	
25	0.0107412733252	0.00941078519597	
30	0.00830963387597	0.00725456029014	
35	0.00668611797844	0.00533380281093	
40	0.00559162569395	0.00369321582977	
45	0.00495286057066	0.0022049643092	
50	0.00432380460103	0.00109793173755	



SAMPLE--ZnSe 4/4(0 0) 3.39um

ANGLE	BTDF DATA	ANGLE	BTDF DATA
0	95914.496935	0	102169.790213
0.2	93.71225852	-0.2	96.3897519621
0.4	7.53044937204	-0.4	34.3053804726
0.6	1.92444817285	-0.6	1.92444817285
0.8	0.920388256582	-0.8	0.819982264953
1	0.711209107359	-1	0.343053804726
1.2	0.376522468602	-1.2	0.30958514085
1.4	0.217546315192	-1.4	0.070284194139
1.6	0.0920388256582	-1.6	0.0451826962322
1.8	0.056060119918	-1.8	0.0276116476975
2	0.0460194128291	-2	0.0225913481161
2.2	0.0442623079756	-2.2	0.0192444817285
2.4	0.02694227442	-2.4	0.0136635820273
2.6	0.0192444817285	-2.6	0.011617994026
2.8	0.0165502542865	-2.8	0.00904490641241
3	0.0136635820273	-3	0.0078902375087
3.5	0.00712045823956	-3.5	0.00481112043213
4	0.00481112043213	-4	0.00365645152842
5	0.00230933780742	-5	0.00211689299014
6	0.00165502542865	-6	0.00157804750174
7	0.00138560268445	-7	0.001347113721
8	0.00115466890371	-8	0.00100071304988
9	9.622240864E-4	-9	9.044906412E-4
10	7.505347874E-4	-10	6.543123788E-4
12	6.543123788E-4	-12	5.380454684E-4
15	4.426230798E-4	-15	3.271561894E-4



SAMPLE--ZnSe 4/4(0 15) 3.39um

ANGLE
0
-0.2
-0.4
-0.6
-0.8
-1
-1.2
-1.4
-1.6
-1.8
-2
-2.2
-2.4
-2.6
-2.8
-3
-3.5
-4
-5
-6
-7
-8
-9
-10
-12
-15

BTDF DATA

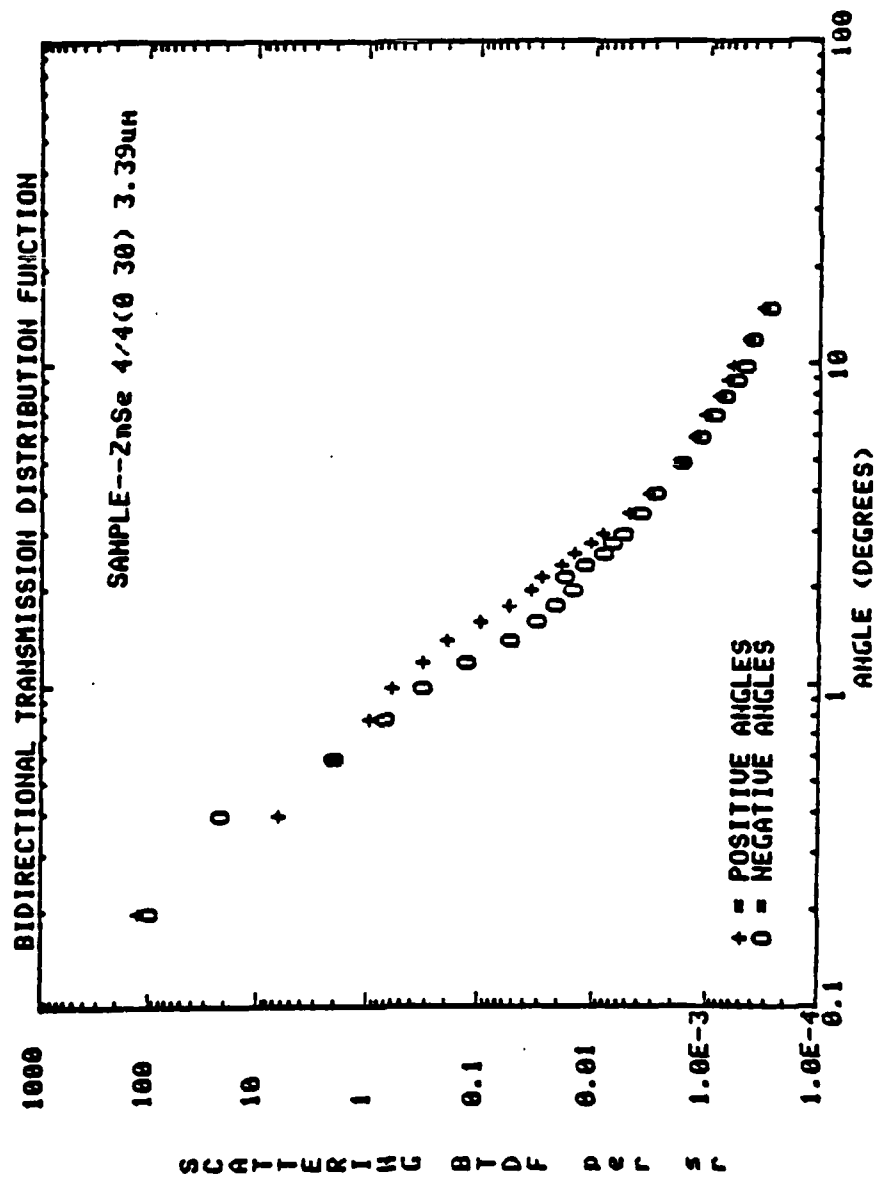
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27.6116476975
1.75710485348
0.719576273328
0.334686538757
0.184077651316
0.062753744767
0.0376522468602
0.0251014979068
0.0167343319379
0.0173200335557
0.0130862475754
0.0101955753161
0.00827512714327
0.0065431237877
0.00461867561485
0.00307911707657
0.00211689299014
0.001347113721
0.00117391338544
9.622240364E-4
7.505347874E-4
6.735568605E-4
5.196010067E-4
3.656451528E-4

ANGLE

0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3
3.5
4
5
6
7
8
9
10
12
15

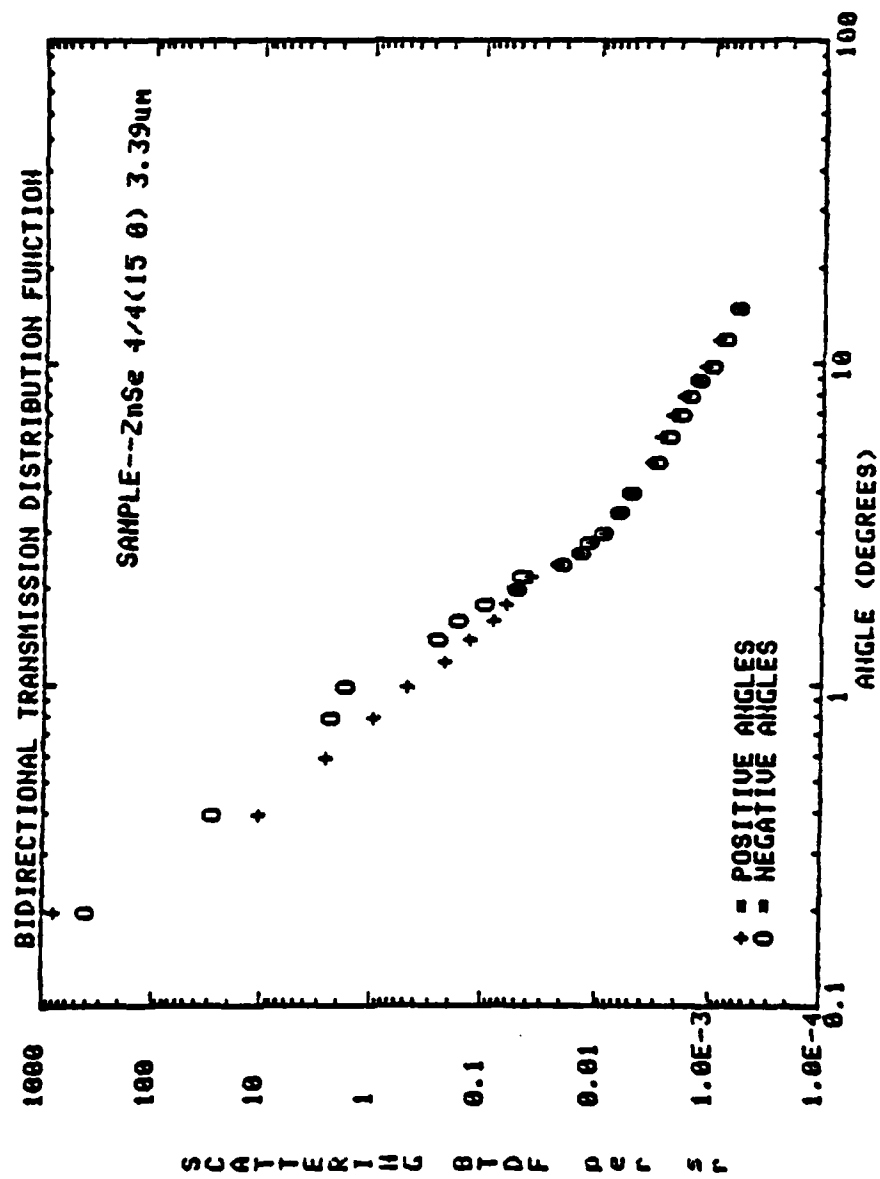
BTDF DATA

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2.09179149223
1.08773157596
0.619170281701
0.351420970695
0.184077651316
0.0920388256582
0.0451825962322
0.0343053804726
0.0442623079756
0.02694227442
0.0192444817285
0.0150106957483
0.0119315786717
0.00596578933585
0.00481112043213
0.00211689299014
0.00167426991038
0.00138560268445
0.00103920201334
0.275127143E-4
7.890237509E-4
5.773344519E-4
4.041341163E-4



SAMPLE--ZnSe 4/4(0 30) 3.39um

ANGLE	BTDF DATA	ANGLE	BTDF DATA
0	03403.9103783	0	79233.7148594
0.2	117.809696843	-0.2	93.712258852
0.4	6.19170281701	-0.4	20.9179149223
0.6	1.84077651316	-0.6	1.92444817285
0.8	0.920388256582	-0.8	0.669373277514
1	0.577334451856	-1	0.70558514085
1.2	0.30958514085	-1.2	0.125507489534
1.4	0.184077651316	-1.4	0.0502029558136
1.6	0.0920388256582	-1.6	0.0292850808913
1.8	0.0518764290074	-1.8	0.0200811963254
2	0.0334686638757	-2	0.0142241821472
2.2	0.02694227442	-2.2	0.0167426991038
2.4	0.0178973680075	-2.4	0.0111617994026
2.6	0.0138560268445	-2.6	0.00769779269141
2.8	0.0100071304988	-2.8	0.00635067897042
3	0.0078902375087	-3	0.0051960100667
3.5	0.00461867561485	-3.5	0.00365645152842
4	0.00307911707657	-4	0.002694227442
5	0.00163578094693	-5	0.0016165364652
6	0.00123164683063	-6	0.00111617994026
7	0.00100071304988	-7	8.275127143E-4
8	7.697792691E-4	-8	6.735568605E-4
9	6.35067897E-4	-9	5.388454834E-4
10	5.773344519E-4	-10	4.426230798E-4
12	4.23378598E-4	-12	3.048896346E-4
15	3.079117077E-4	-15	2.694227442E-4



SAMPLE--2nSz 4/4(15 0) 3.39um

ANGLE
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
3
3.5
4
5
6
7
8
9
10
12
15

BTDF DATA

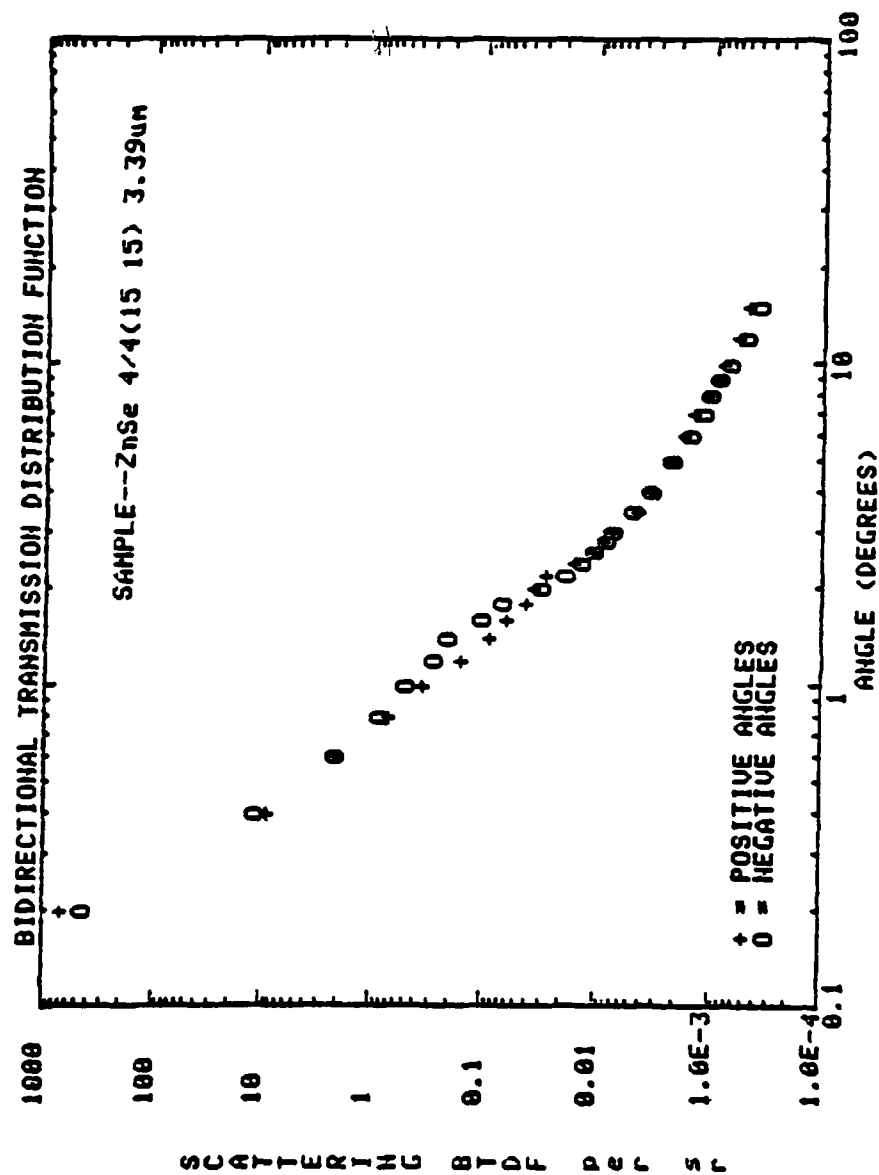
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729.198514132
10.0405991627
2.51014979068
0.920388256582
0.451826962322
0.209179149223
0.125507489534
0.0769779269141
0.0602435949763
0.0485295626198
0.0365645152842
0.0211689299014
0.0138560268445
0.0103920201334
0.00808268232599
0.00615823415313
0.00500356524942
0.00327156189335
0.002694227442
0.00211689299014
0.00167426991038
0.00128938027581
0.00111617994026
0.467571961E-4
5.773344519E-4

ANGLE

0
-0.2
-0.4
-0.6
-0.8
-1
-1.2
-1.4
-1.6
-1.8
-2
-2.2
-2.4
-2.6
-2.8
-3
-3.5
-4
-5
-6
-7
-8
-9
-10
-12
-15

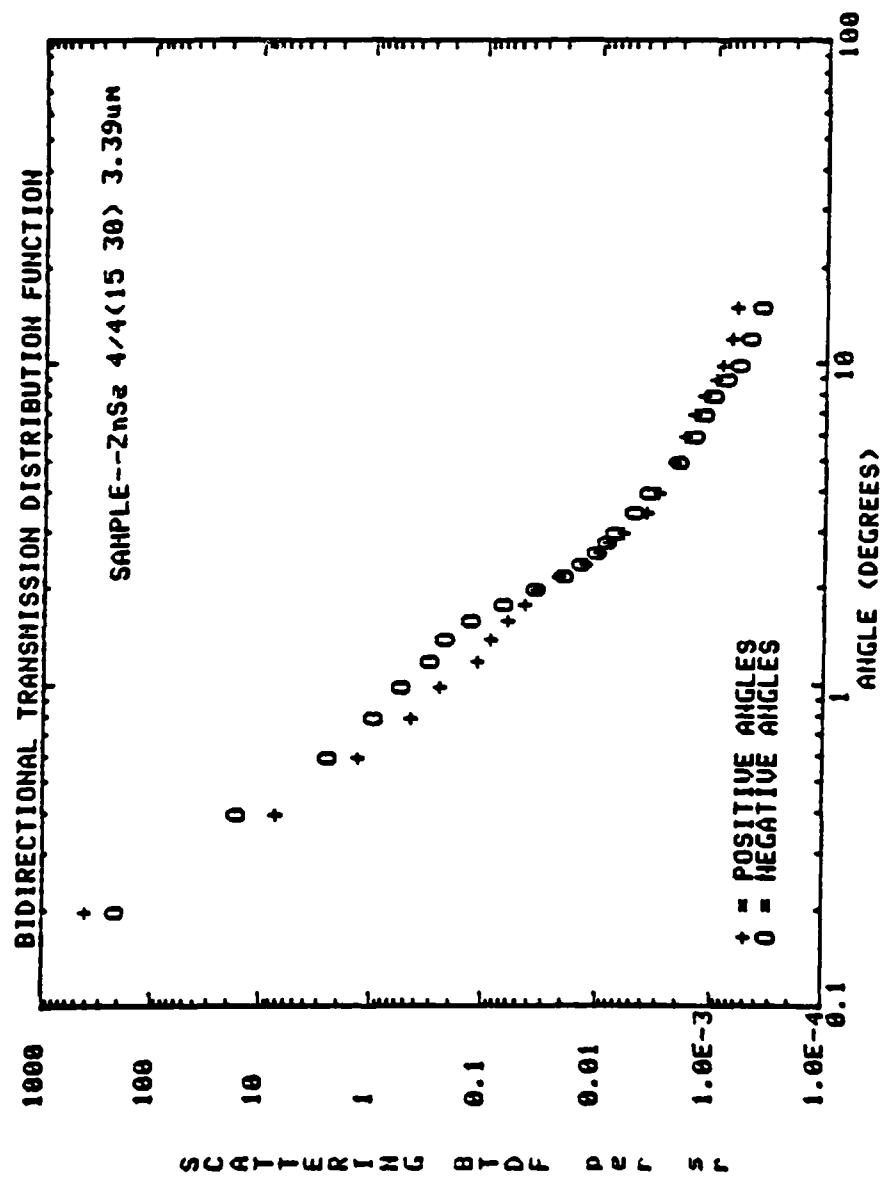
BTDF DATA

106339.985732
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26.7749311006
443.911623316
2.25913481161
1.67343319379
6.44271779608
0.242647813099
0.15897615341
0.0920388256582
0.0476928460229
0.0442623079756
0.0192444817285
0.0130862475754
0.0111617994026
0.00846757196056
0.00615823415313
0.00481112043213
0.00288667225928
0.00230933780742
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0.00123164683063
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7.505347874E-4
5.773344519E-4



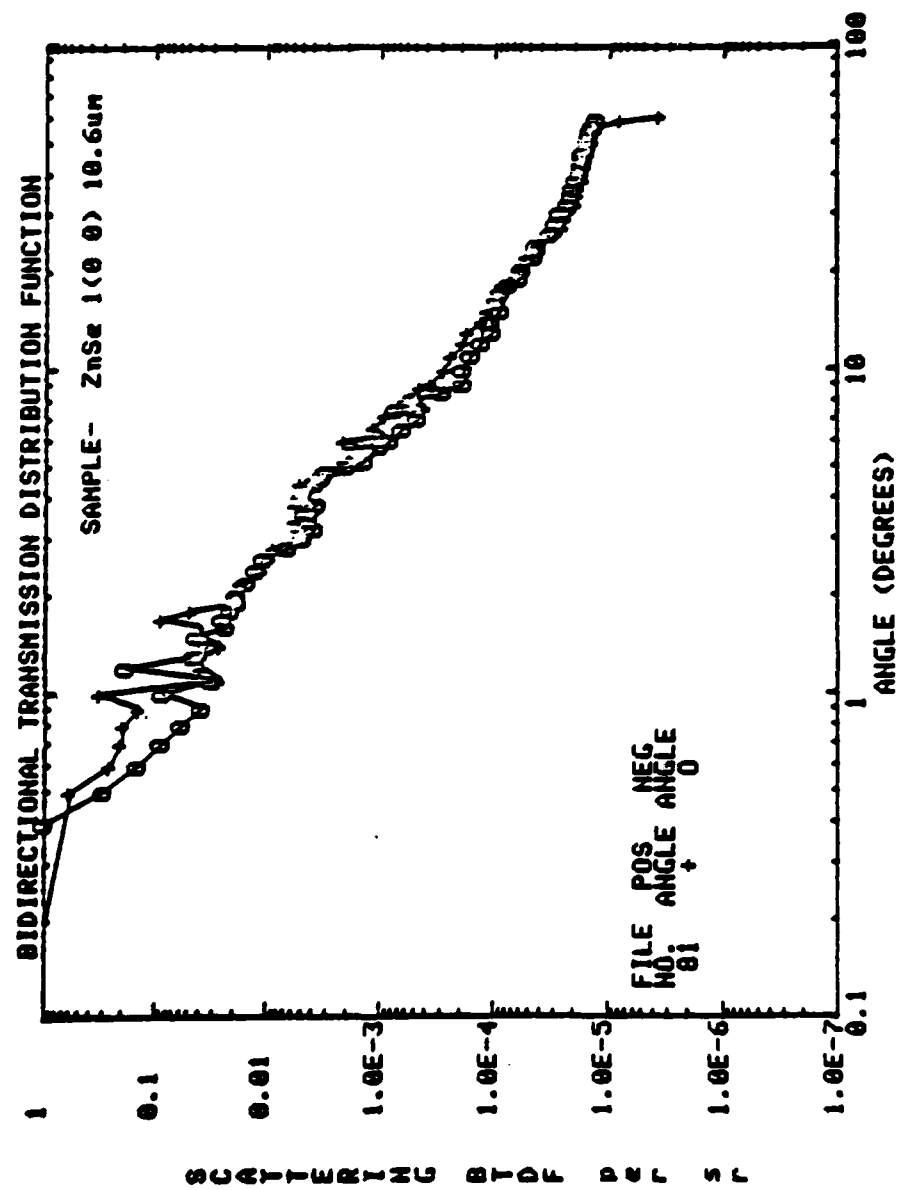
SAMPLE--ZnSe 4/4(15 15) 3.39um

ANGLE	BTDF DATA	ANGLE	BTDF DATA
0	97999.5946945	0	100084.692454
0.2	659.75103665	-0.2	422.257397788
0.4	8.36716596893	-0.4	10.8773157596
0.6	1.92444817285	-0.6	2.00811983254
0.8	0.669373277514	-0.8	0.803247933017
1	0.326319472788	-1	0.46856129426
1.2	0.150608987441	-1.2	0.267749311006
1.4	0.0836716596893	-1.4	0.200811983254
1.6	0.0602435949763	-1.6	0.100405991627
1.8	0.0401623966509	-1.8	0.0652638945576
2	0.0343053804726	-2	0.0292850808913
2.2	0.02694227442	-2.2	0.0180898128248
2.4	0.0150106957483	-2.4	0.0128938027581
2.6	0.0100071304988	-2.6	0.0100071304988
2.8	0.00827512714327	-2.8	0.0078902375087
3	0.00692801342227	-3	0.00692801342227
3.5	0.00423378598028	-3.5	0.00461867561485
4	0.00307911707657	-4	0.00327156189385
5	0.00211689299014	-5	0.00211689299014
6	0.00169351439211	-6	0.00150106957483
7	0.00138560268445	-7	0.0011546890371
8	0.00105846495507	-8	0.00100071304988
9	0.275127143E-4	-9	8.275127143E-4
10	7.697792691E-4	-10	6.735568605E-4
12	5.773344519E-4	-12	4.811120432E-4
15	4.618675615E-4	-15	3.656451528E-4



SAMPLE--ZnSe 4/4(15 30) 3.39um

ANGLE	BTDF DATA	ANGLE	BTDF DATA
0	104254.087973	0	104254.087973
0.2	378.948946733	-0.2	205.715142512
0.4	6.86107609452	-0.4	15.897615341
0.6	1.25507489534	-0.6	2.3428064713
0.8	0.426725464415	-0.8	0.920388256582
1	0.23428064713	-1	6.518764290074
1.2	0.108773157596	-1.2	0.292850808913
1.4	0.0836716596893	-1.4	0.217546315192
1.6	0.0602435949763	-1.6	0.125507489534
1.8	0.0418358298446	-1.8	0.0652638945576
2	0.0326319472788	-2	0.0343053804726
2.2	0.0211689299014	-2.2	0.0192444817285
2.4	0.0123164683063	-2.4	0.01347113721
2.6	0.0092373512297	-2.6	0.0100071304988
2.8	0.00769779269141	-2.8	0.00808268232599
3	0.00577334451856	-3	0.00692801342227
3.5	0.00365645152842	-3.5	0.00461867561485
4	0.00288667225928	-4	0.00346400671114
5	0.00211689299014	-5	0.00192444817285
6	0.00159351439211	-6	0.00138560260445
7	0.00140484716618	-7	0.00115466890371
8	0.00115466890371	-8	9.622240864E-4
9	9.23735123E-4	-9	7.505347874E-4
10	8.082682326E-4	-10	5.773344519E-4
12	6.735568605E-4	-12	4.618675615E-4
15	6.158234153E-4	-15	3.656451528E-4



SAMPLE - ZnSe 1(0 0) 10.6um

ANGLE
0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2 2.2 2.4 2.6 2.8 3 3.2 3.4 3.6

BTDF DATA
19246.4638612
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2176.02400368
240.185007462
3.29499246464
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0.25253674079
0.20071561089
0.18926219747
0.13744107478
0.31176891134
0.02558305456
0.03727976973
0.03690033426
0.02521811793
0.03789735771
0.03932903623
0.08547959826
0.04628156539
0.01683391378
0.01863907339
0.01665571780
0.01087164098
0.00913035619
0.00853433256
0.00485729141
0.00520676933
0.00560222051
0.00389144827
0.00547528640

ANGLE
4 4.2 4.4 4.6 4.8 5 5.2 5.4 5.6 5.8 6 6.2 6.6 7.2 7.6 8 8.4 8.8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

BTDF DATA
0.00527878185699
0.00486583705692
0.0050110802519
0.00388046500237
0.00273276218226
0.00226733437944
0.00170426424088
0.00169653439567
0.00142517040639
0.00168188840515
0.00204519930781
9.511988309E-4
0.00115014530956
0.956246399E-4
4.022866754E-4
6.010298115E-4
4.853643697E-4
4.443139961E-4
3.638403739E-4
2.750266237E-4
2.382237369E-4
1.880722143E-4
1.722542825E-4
1.298408101E-4
1.28510759E-4
9.720390019E-5
9.281009401E-5
8.538933089E-5
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5.925767057E-5
5.455865938E-5
5.223971544E-5
4.010749144E-5

ANGLE

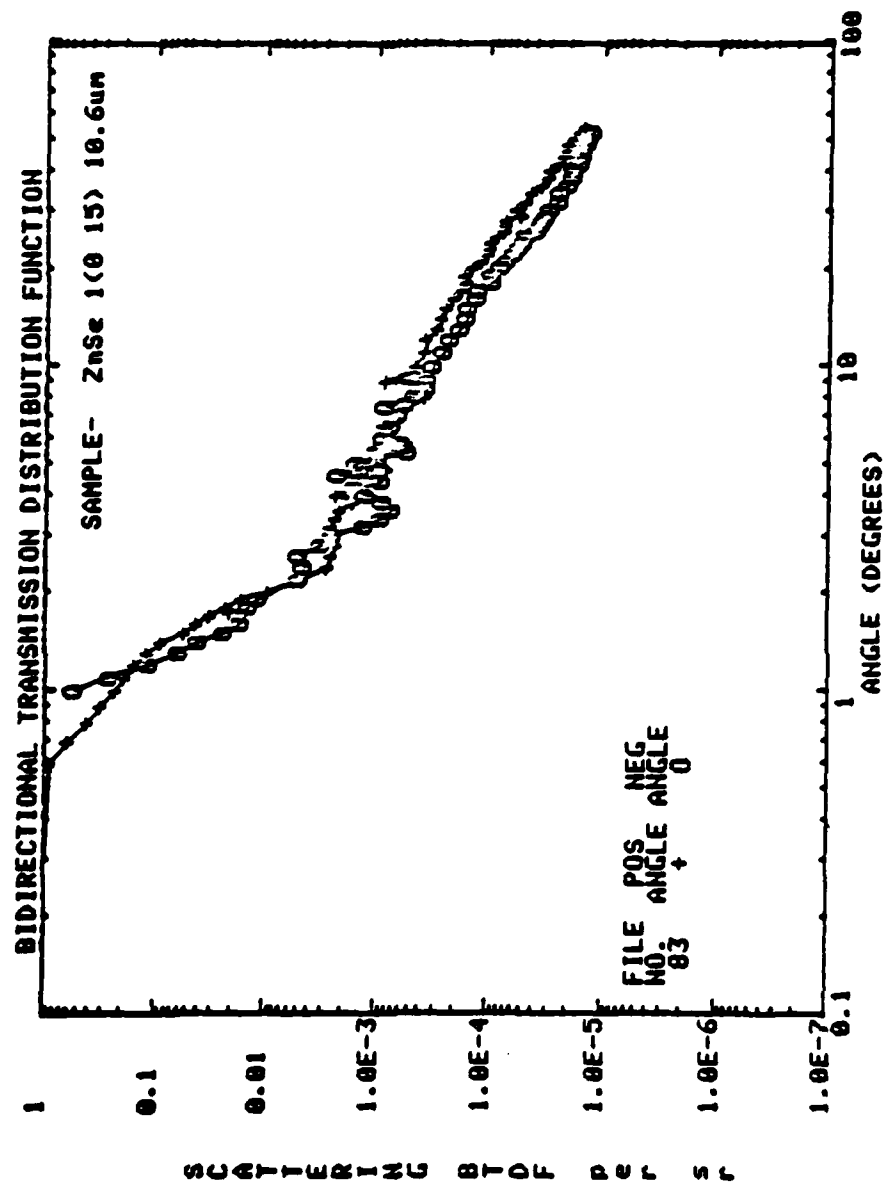
ZnSe 1(0 0) 10.6 μm

BTDF DATA

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2.601036989E-5
2.360590727E-5
2.291024263E-5
1.90655327E-5
1.873120721E-5
1.839688446E-5
1.696645767E-5
1.666020553E-5
1.595969265E-5
1.647614918E-5
1.489677018E-5
1.482732267E-5
1.382650953E-5
1.40085217E-5
1.290759546E-5
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7.945648322E-6
3.654067351E-6
9.726781246E-6
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1.490450069E-5
1.521605069E-5
1.570920052E-5
1.716717272E-5
1.601914799E-5
1.749402027E-5
1.010785765E-5

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-20
-19
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-7
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-6
-5.8
-5.6
-5.4
-5.2
-5
-4.8

1.913101709E-5
2.060250001E-5
2.142071580E-5
2.296652133E-5
2.636691056E-5
2.060464114E-5
3.218996001E-5
4.200067665E-5
4.461491399E-5
5.793093343E-5
6.006060536E-5
7.524660162E-5
8.807994537E-5
9.440086007E-5
0.957538093E-5
1.071388072E-4
1.033672159E-4
1.30231068E-4
1.601706168E-4
1.857406136E-4
1.883279762E-4
2.86051731E-4
5.025330151E-4
7.237335323E-4
4.702293188E-4
6.419576136E-4
8.109747775E-4
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0.0012002529931
0.00152199884274
0.00136463192092
0.0019536993403
0.00299680307199



SAMPLE - ZnSe 1(0 15) 10.6um

ANGLE
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1.1
1.2
1.3
1.4
1.5
1.6
1.7
1.8
1.9
2
2.2
2.4
2.6
2.8
3
3.2
3.4
3.6
3.8

BTDF DATA
17883.2409094
15245.3563383
949.687435708
8.89459413724
2.68604383664
1.50031217932
0.872804257335
0.591380915405
0.398866774669
0.305426387434
0.224844768353
0.182165902061
0.153386752784
0.115667696355
0.0848474712848
0.0520670138464
0.0399030096173
0.0305940222091
0.0219104934624
0.0158671377008
0.00919193597754
0.00451610002054
0.00267292077864
0.00247236309256
0.00223630843698
0.00257441711303
0.00255400650726
0.00230552790557
0.00207568518914
0.0015876019916

ANGLE
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ANGLE
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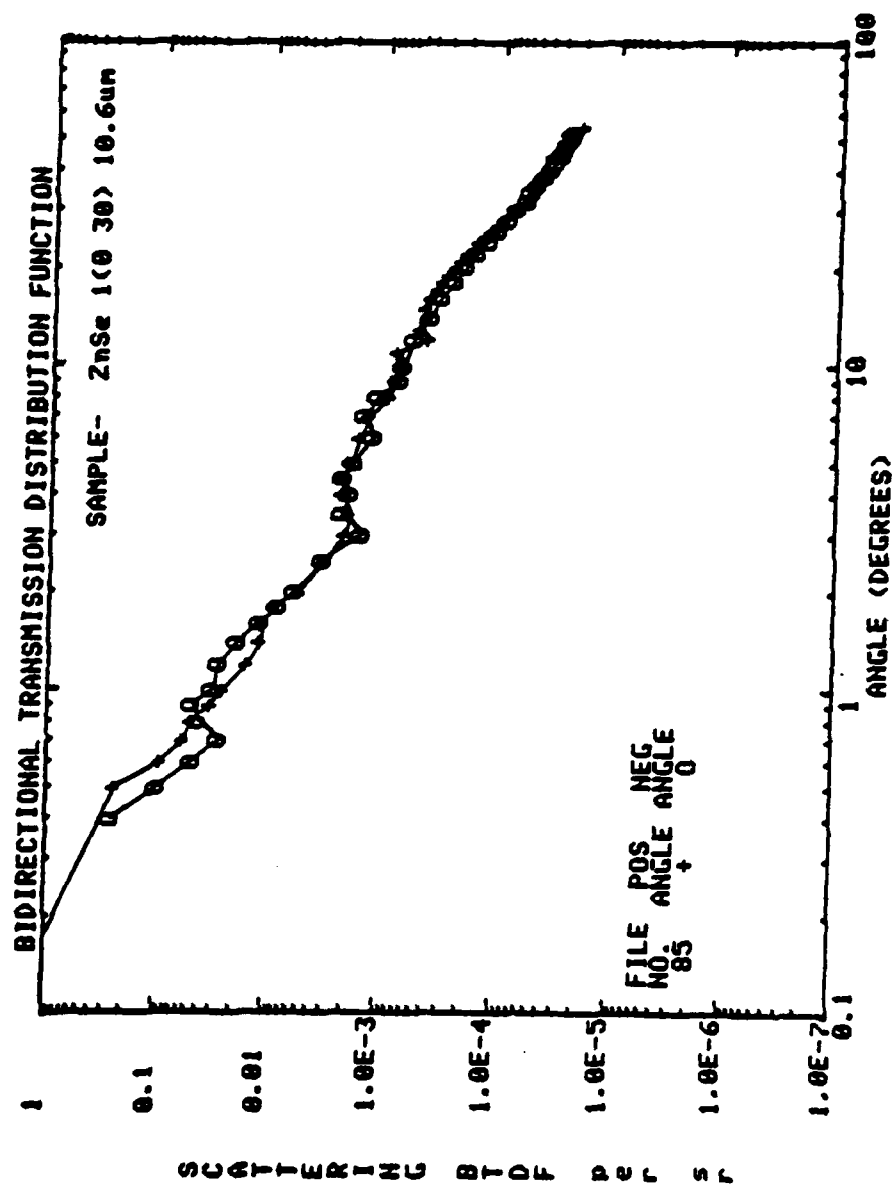
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-4.4

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 0.0138021022600
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 0.0161298143624
 0.0231475611673
 0.0389037693744
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 0.113340870021
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 1.05819507194
 1.89207604195
 5.76807643727
 39.7948285984
 1.38678761886
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 34.2729053456
 2523.25784357
 10416.3375434



SAMPLE - ZnSe 1(0 30) 10.6um

ANGLE

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0.6
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BTDF DATA

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0.00220098854
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ANGLE

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BTDF DATA

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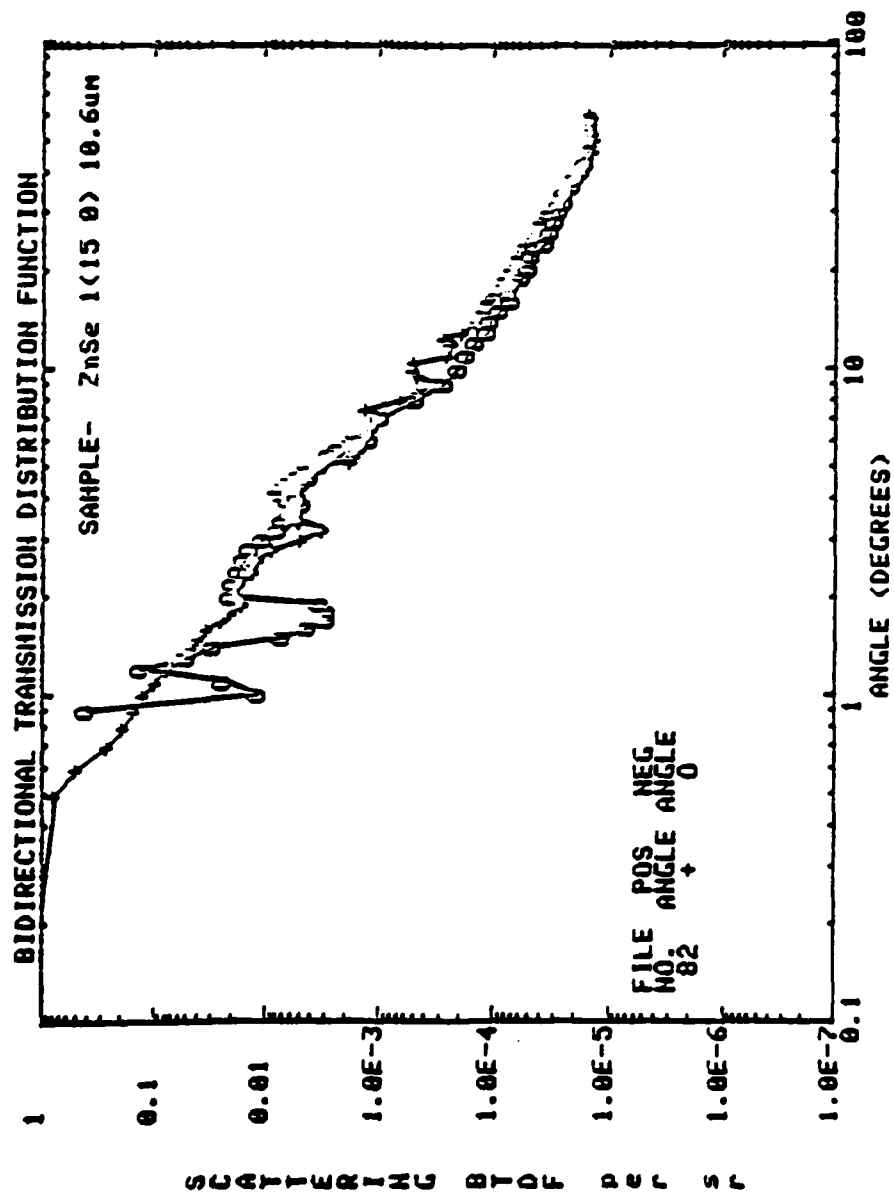
ZuSe 1(0 30) 10.6 um

ANGLE
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-1.6
-1.4

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0.001471760482
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0.005574389133
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ANGLE
-1.2
-1
-0.9
-0.8
-0.7
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-0.4
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-0.2
-0.1
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BTDF DATA
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SAMPLE - ZnSe 1(15 0) 10.6um

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ANGLE
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ZnSe 1(15 0) 10.6 μ m

ANGLE
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-3
-2.8

BTDF DATA
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ANGLE
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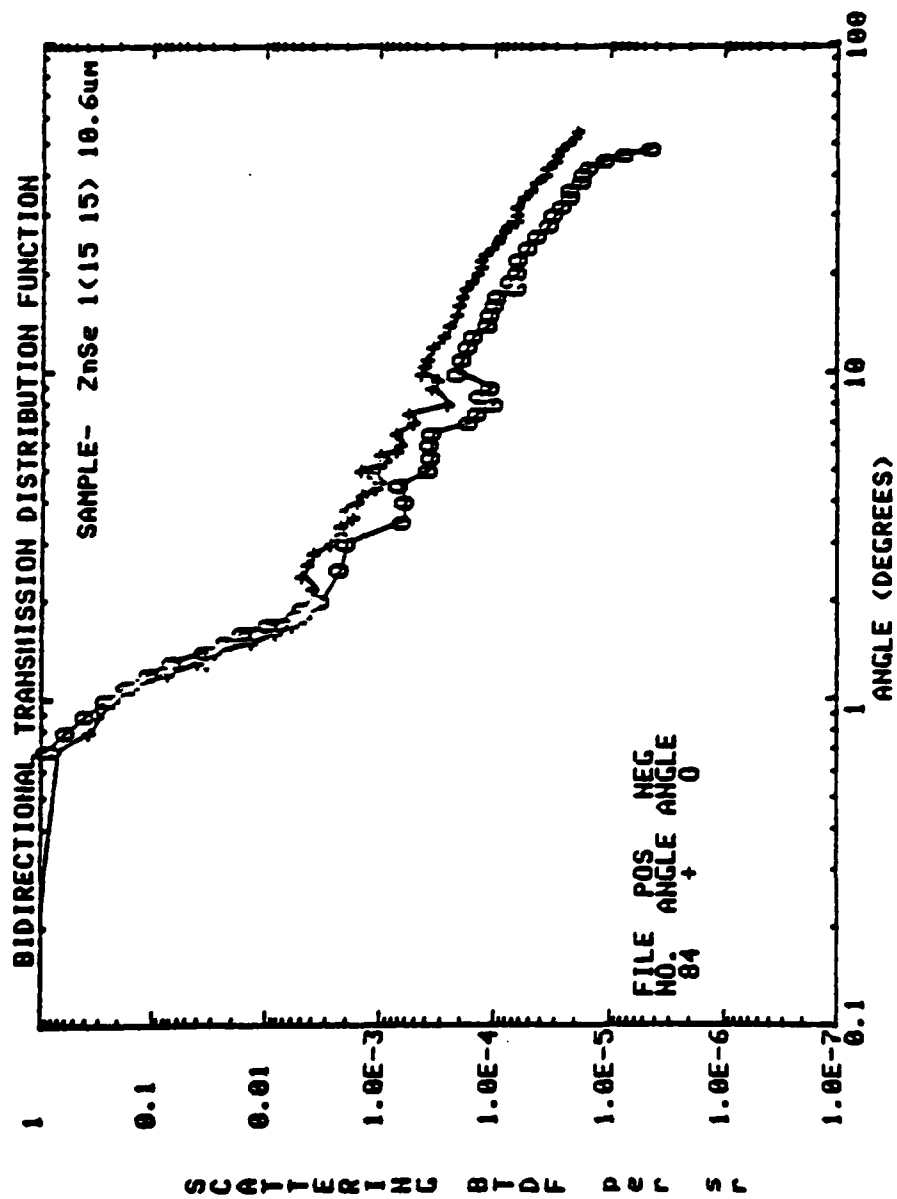
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ZnSe 1(15 0) 10.6 μ m

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SAMPLE - ZnSe 1(15 15) 10.6um

ANGLE
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0.6
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3.8

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ANGLE
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BTDF DATA
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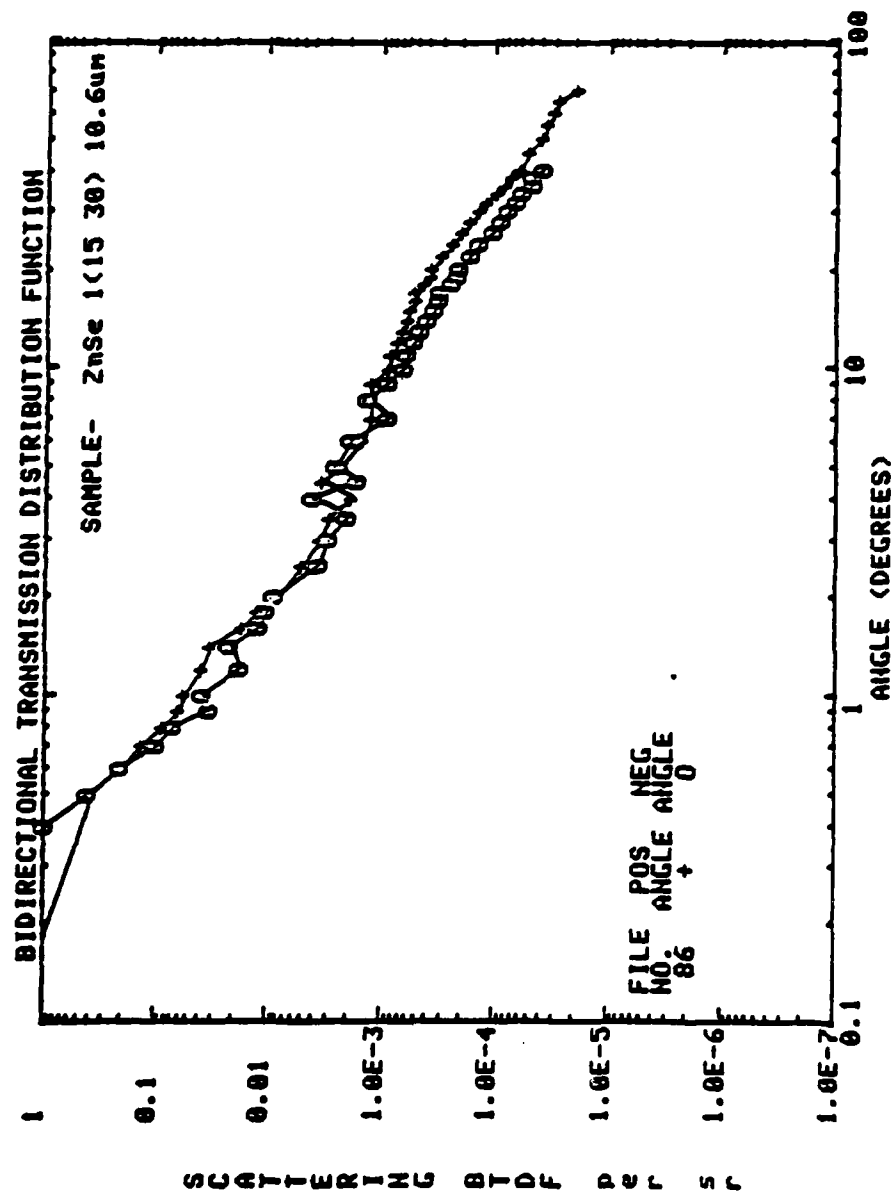
ZnSe 1 (15 15) 10.6 μm

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BTDF DATA
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SAMPLE -- ZnSe 1(15 30) 10.6um

ANGLE

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BTDF DATA

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ANGLE

14 15 16 17 18 19 20 22 24 26 28 30 32 34 36 38 40 45 50 55 60 65 70 -45 -40 -38 -36 -34 -32 -30 -28 -26

BTDF DATA

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5.590172501E-4
4.061715000E-4
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3.625109036E-4
3.547993570E-4
2.051866841E-4
2.305051739E-4
1.90434002E-4
1.623500750E-4
1.360223052E-4
1.156414120E-4
9.507903101E-5
8.06695642E-5
6.9683145E-5
5.915051404E-5
4.965717821E-5
3.807354206E-5
3.45001570E-5
2.996477016E-5
2.7154195E-5
1.89110442E-5
2.270702329E-5
3.74252660E-5
4.571636634E-5
4.646170974E-5
5.701272044E-5
6.413561835E-5
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8.632593075E-5
1.023764651E-4

ZnSe 1" (15 30) 10.6 μ m

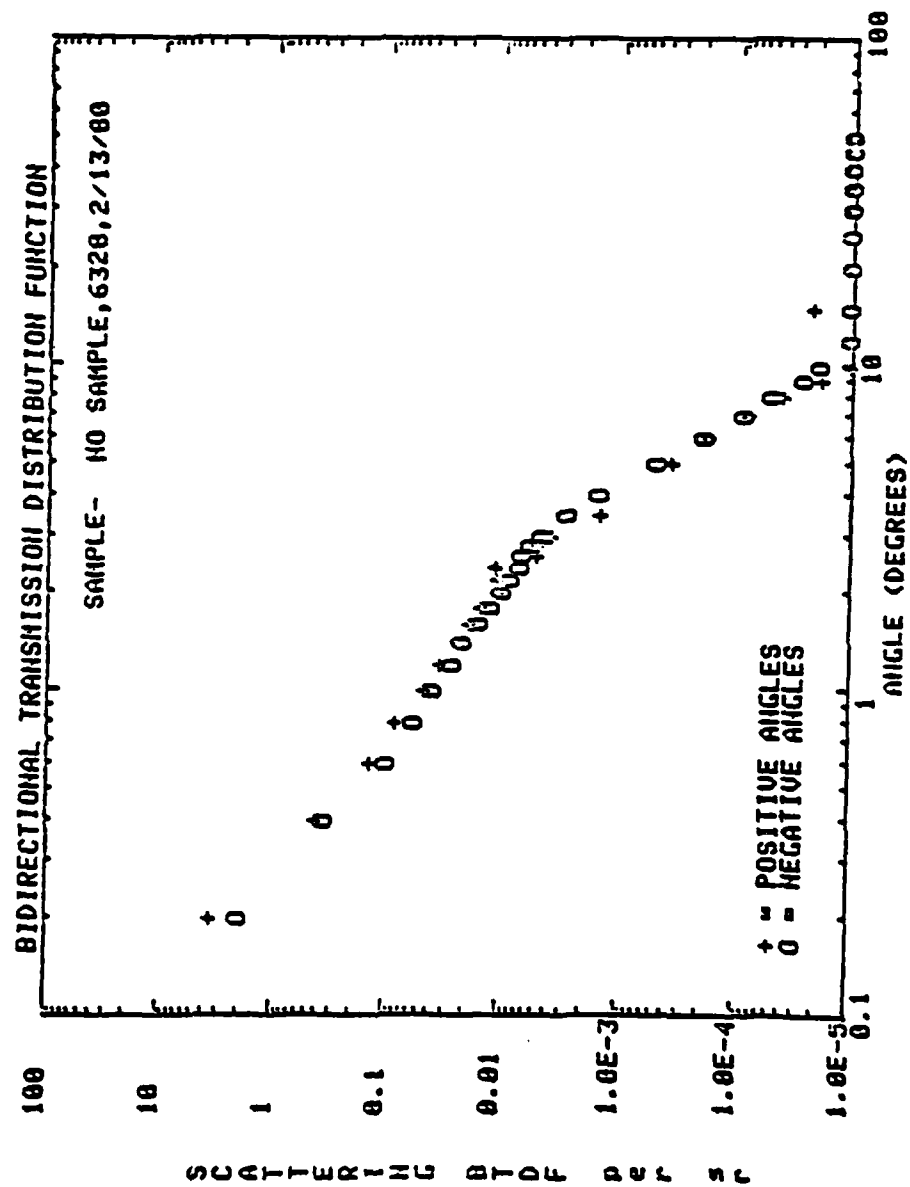
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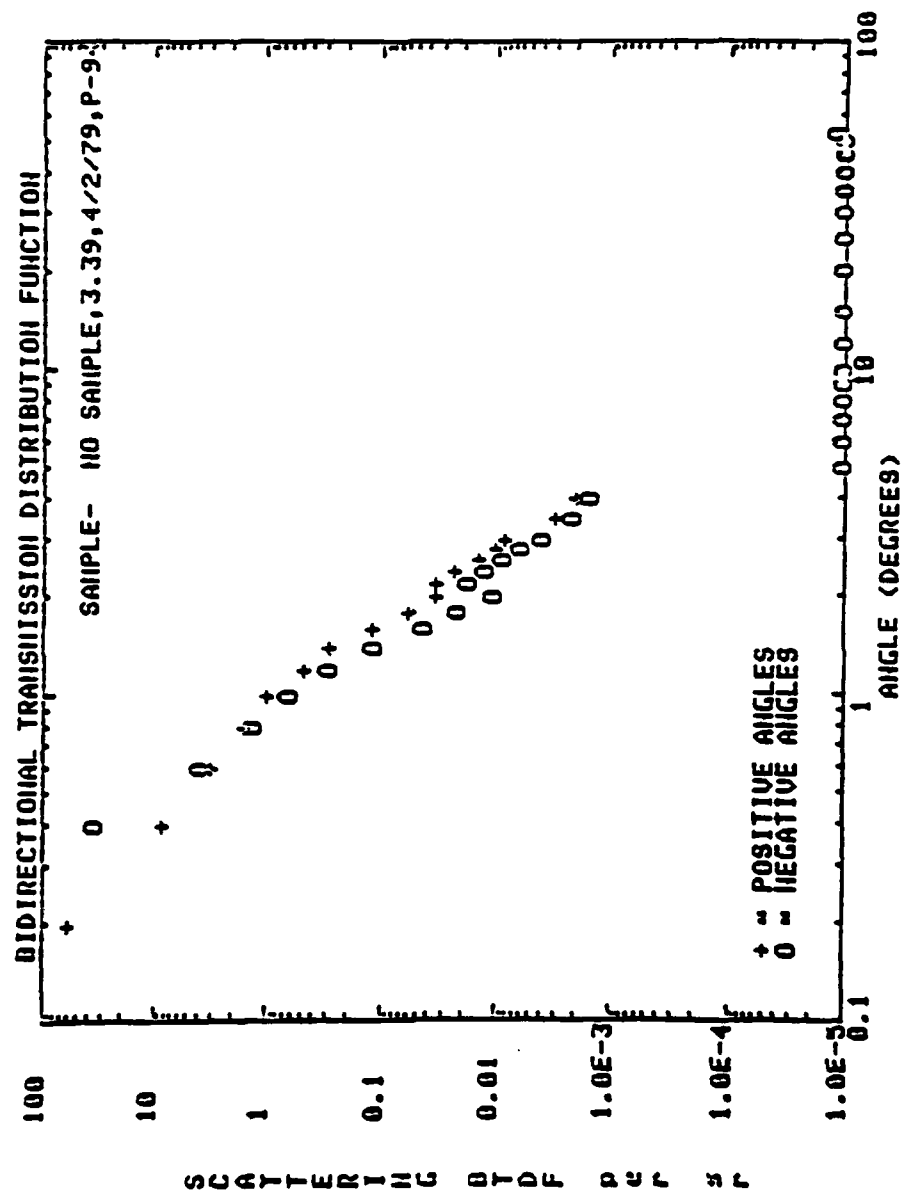
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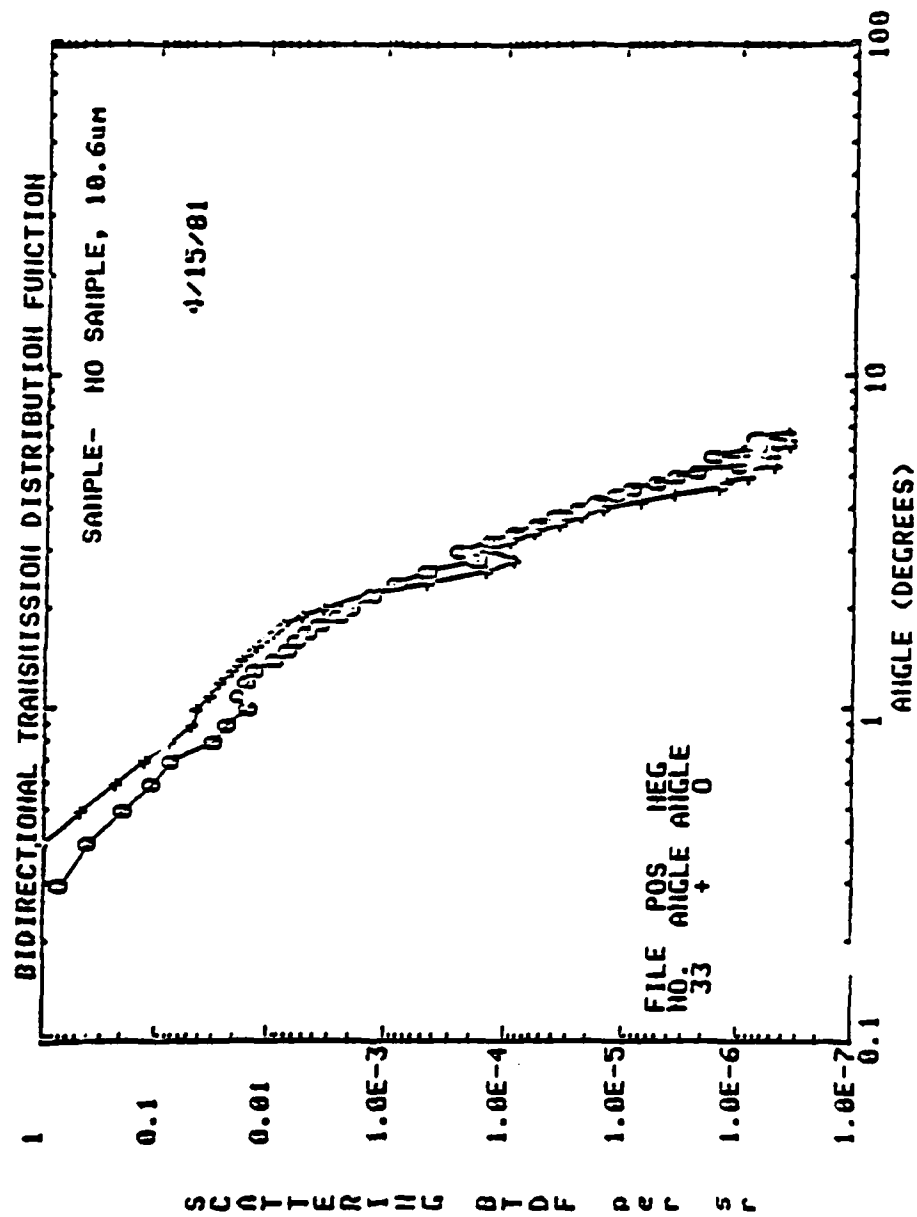
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3.92439875E-4
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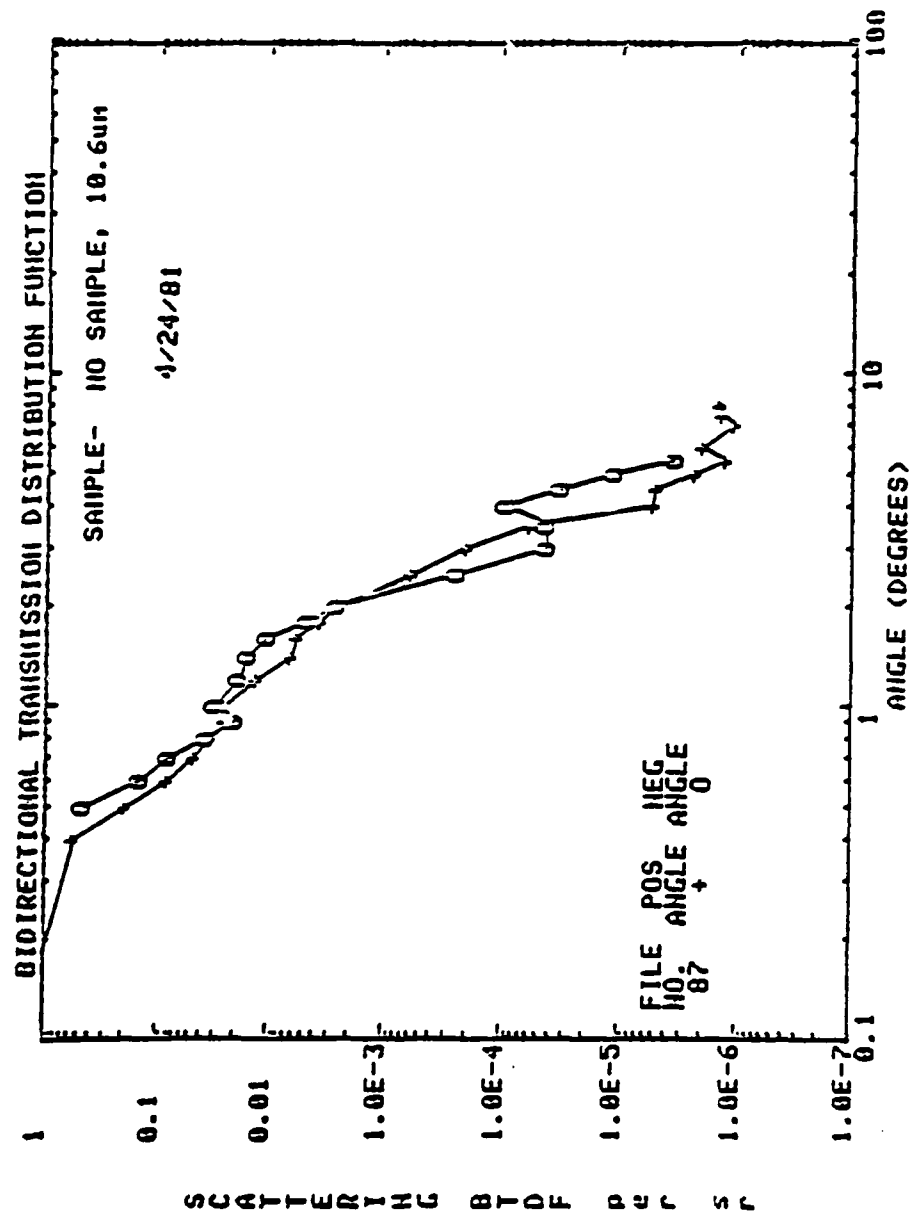
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-0.1
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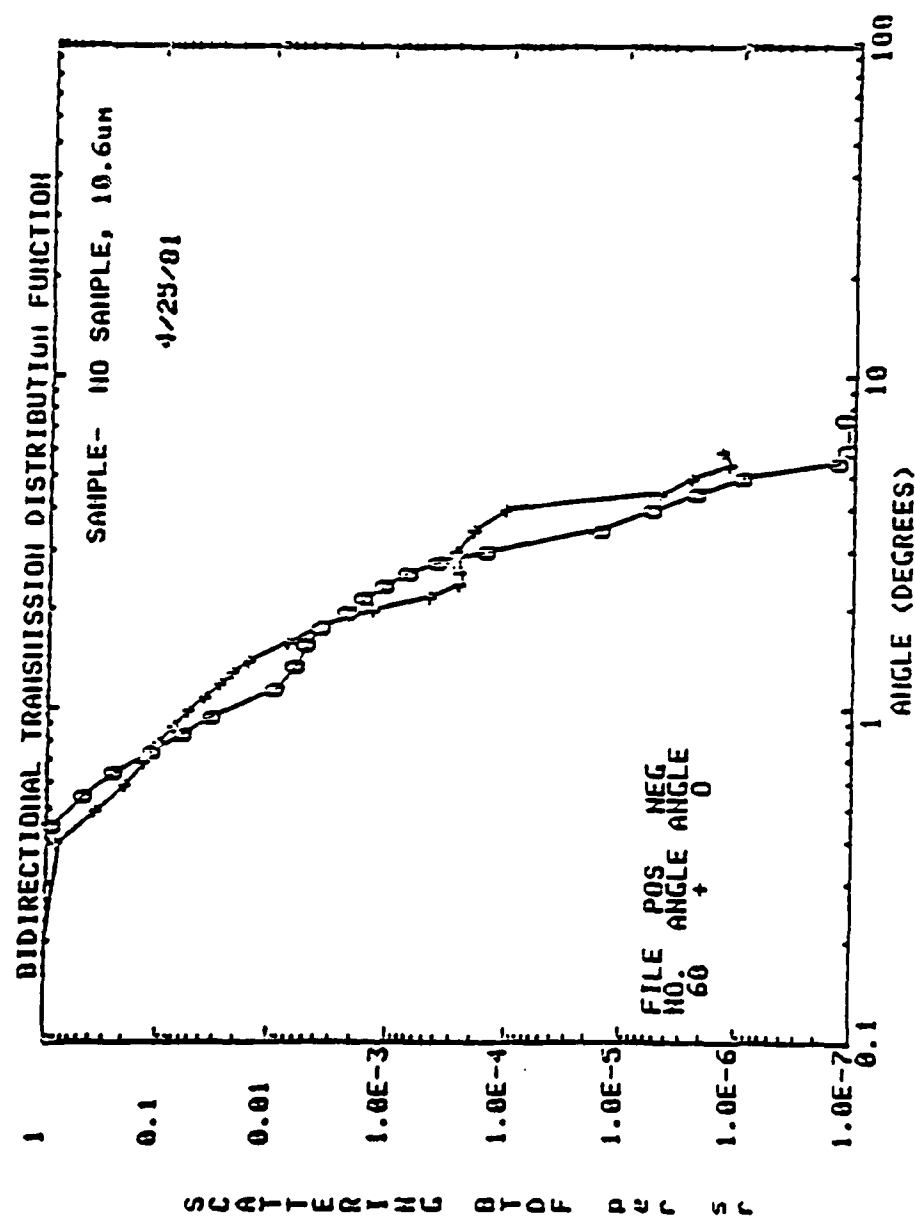
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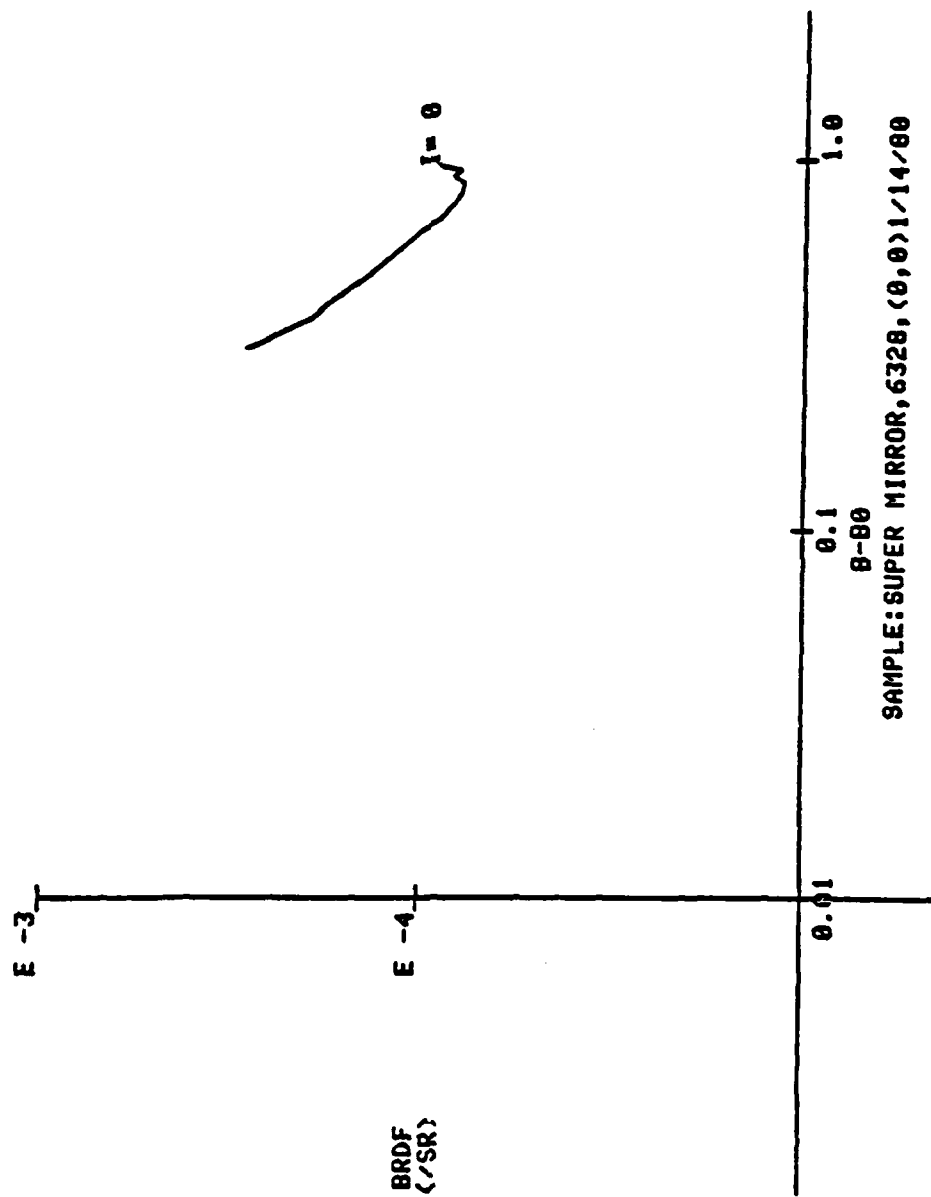






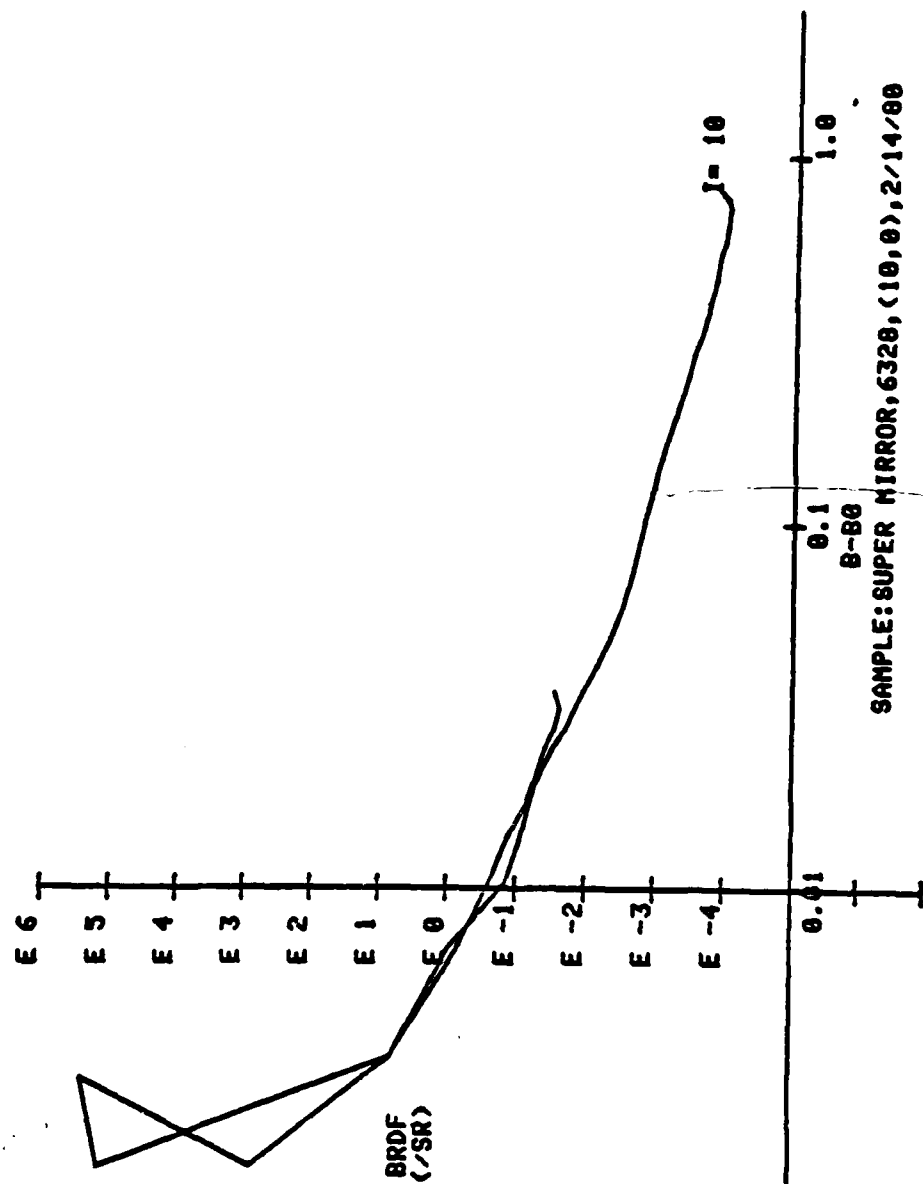






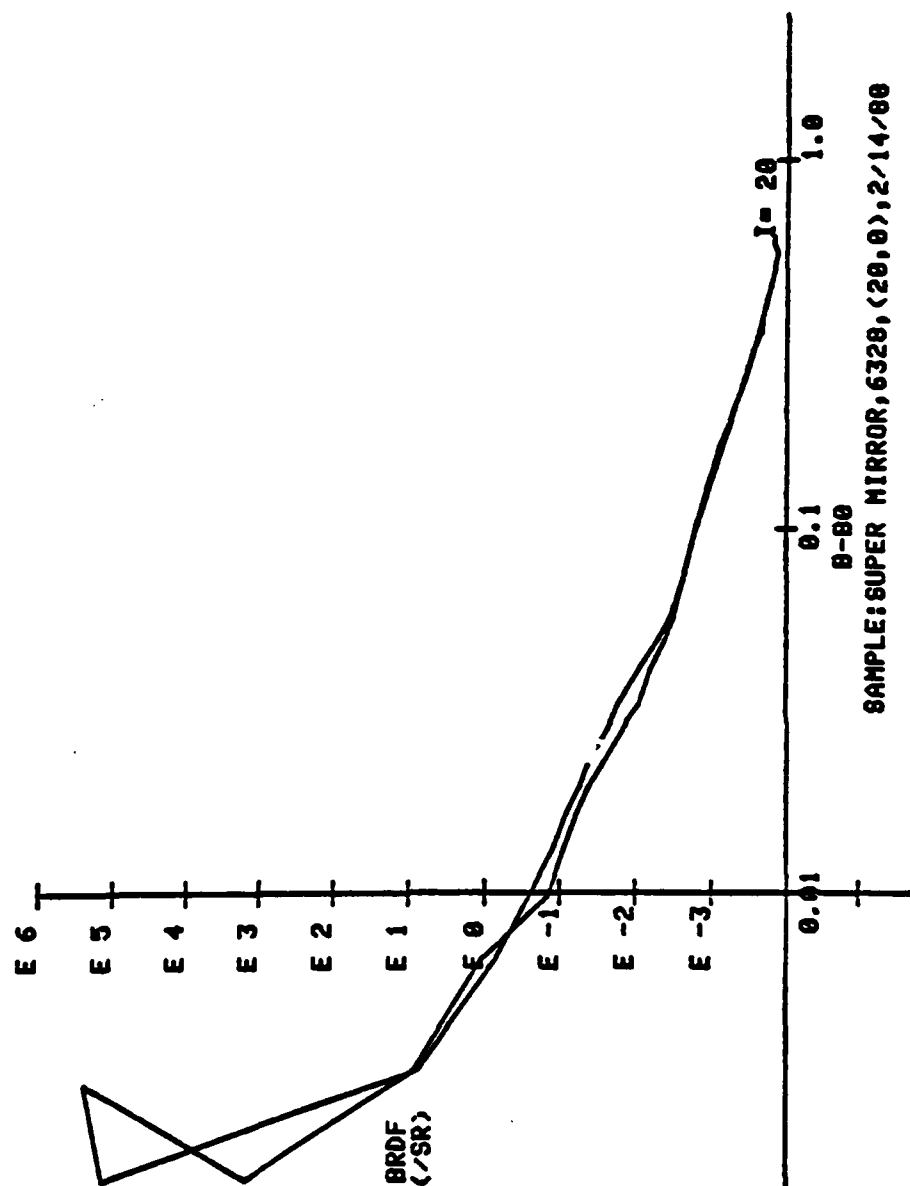
SUPER MIRROR, 6328, (0,0)1/14/80

ANG. FROM SPEC,	BRDF(<SR>
18.0	2.84970E-004
19.0	2.53880E-004
20.0	2.33480E-004
22.0	1.94871E-004
24.0	1.78003E-004
26.0	1.60821E-004
28.0	1.46168E-004
30.0	1.34121E-004
32.0	1.26312E-004
36.0	1.11667E-004
40.0	1.01084E-004
44.0	8.97061E-005
48.0	8.48648E-005
50.0	8.23194E-005
55.0	7.87522E-005
60.0	7.74350E-005
65.0	8.24521E-005
70.0	7.92417E-005
75.0	8.97558E-005



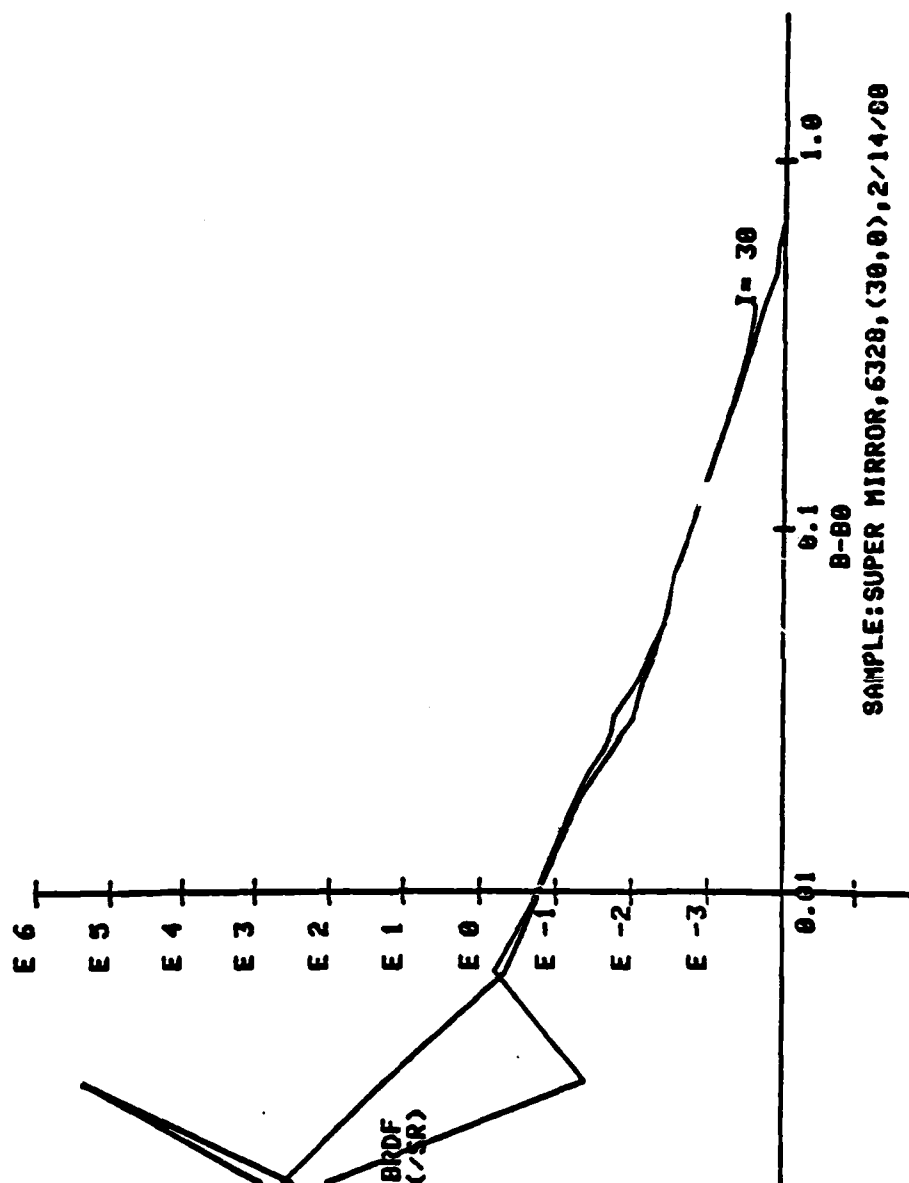
SUPER MIRROR, 6320, (10,0), 2/14/80

ANG. FROM SPEC,	BRDF(</SR>	ANG. FROM SPEC,	BRDF(</SR>
-2.0	2.79610E-002	4.0	2.39417E-003
-1.8	2.37075E-002	4.5	2.05289E-003
-1.6	2.72775E-002	5.0	1.79039E-003
-1.4	3.79712E-002	6.0	1.42315E-003
-1.2	4.06766E-002	7.0	1.16062E-003
-1.0	7.12729E-002	8.0	9.90610E-004
-0.8	1.30740E-001	9.0	8.32618E-004
-0.6	2.37845E-001	10.0	7.05933E-004
-0.4	6.78255E-001	11.0	6.08257E-004
-0.2	6.19128E+000	12.0	5.28937E-004
-0.1	1.29342E+000	14.0	4.12514E-004
0.0	2.28741E+000	16.0	3.38874E-004
0.1	7.15035E+000	18.0	2.92335E-004
0.2	6.32289E+000	20.0	2.38438E-004
0.4	9.24701E-001	25.0	1.78033E-004
0.6	1.40848E-001	30.0	1.46572E-004
0.8	8.36090E-002	35.0	1.29586E-004
1.0	6.21513E-002	40.0	1.12436E-004
1.2	4.32965E-002	45.0	1.03503E-004
1.4	2.87249E-002	50.0	9.80843E-005
1.6	1.91635E-002	55.0	9.46672E-005
1.8	1.43830E-002	60.0	1.01882E-004
2.0	1.12150E-002	65.0	1.19674E-004
2.2	8.58262E-003	70.0	1.33779E-004
2.4	6.73918E-003		
2.6	5.55421E-003		
2.8	4.63215E-003		
3.0	3.97359E-003		
3.5	2.88014E-003		



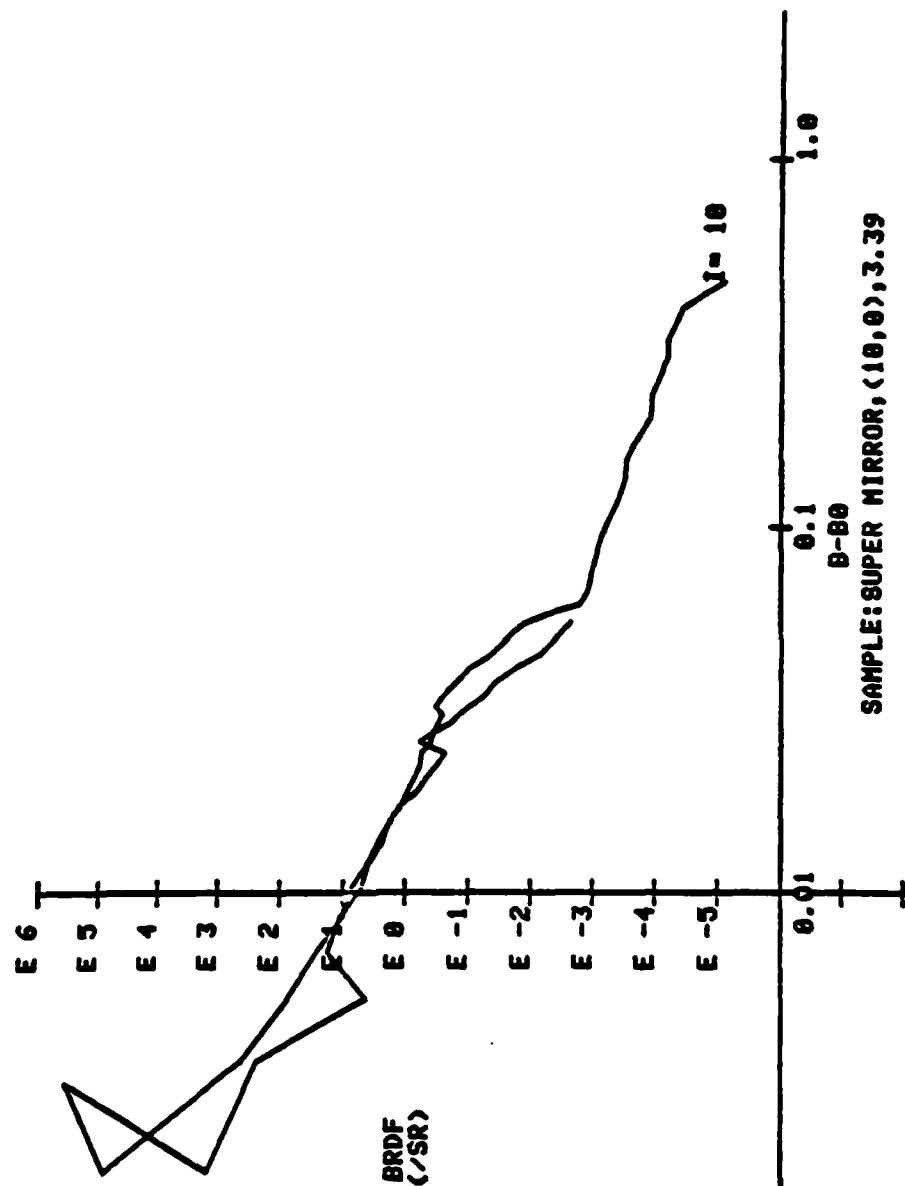
SUPER MIRROR, 6328, (20,0), 2/14/80

ANG.	FROM SPEC	BRDF(</SR>)	ANG.	FROM SPEC	BRDF(</SR>)
-22.0		2.06619E-004	0.4		1.10656E+000
-20.0		2.19399E-004	0.6		1.37874E-001
-18.0		2.71188E-004	0.8		8.53437E-002
-16.0		3.23434E-004	1.0		5.78095E-002
-14.0		4.02285E-004	1.2		4.02695E-002
-12.0		5.21307E-004	1.4		2.52627E-002
-10.0		7.46981E-004	1.6		1.76662E-002
-8.0		1.06873E-003	1.8		1.26362E-002
-6.0		1.55621E-003	2.0		8.60471E-003
-5.0		1.95072E-003	2.5		6.18834E-003
-4.5		2.25001E-003	3.0		4.07993E-003
-4.0		2.61806E-003	3.5		3.09607E-003
-3.5		3.23843E-003	4.0		2.61353E-003
-3.0		4.79891E-003	4.5		2.28344E-003
-2.5		8.21401E-003	5.0		2.03632E-003
-2.0		1.60126E-002	6.0		1.60821E-003
-1.8		2.02547E-002	8.0		1.05241E-003
-1.6		2.79442E-002	10.0		7.60021E-004
-1.4		3.96133E-002	12.0		5.78295E-004
-1.2		5.27976E-002	15.0		4.12784E-004
-1.0		7.91670E-002	17.0		3.39357E-004
-0.8		1.22745E-001	20.0		2.69558E-004
-0.6		2.48776E-001	25.0		2.19019E-004
-0.4		7.02417E-001	30.0		1.80701E-004
-0.2		7.48187E+000	35.0		1.57504E-004
-0.1		1.31015E+005	40.0		1.44545E-004
0.0		2.39722E+005	45.0		1.34366E-004
0.1		1.49922E+003	50.0		1.47163E-004
0.2		8.50102E+000	55.0		1.49593E-004



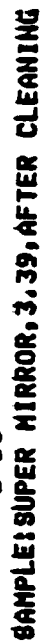
SUPER MIRROR, 6328, (30, 0), 2/14/80

ANG. FROM SPEC	BRDF(<SR)	ANG. FROM SPEC	BRDF(<SR)
-40.0	1.04839E-004	0.6	1.90831E-001
-35.0	1.17892E-004	0.8	1.09272E-001
-30.0	1.29058E-004	1.0	6.95331E-002
-25.0	1.81372E-004	1.2	4.77333E-002
-20.0	2.43752E-004	1.4	3.02403E-002
-15.0	3.87472E-004	1.6	3.02403E-002
-10.0	8.24046E-004	1.8	1.92851E-002
-7.0	1.47214E-003	2.0	1.40809E-002
-5.0	2.49200E-003	2.5	9.68436E-003
-4.5	2.73106E-003	3.0	7.19208E-003
-4.0	3.21643E-003	3.5	5.01663E-003
-3.5	3.80714E-003	4.0	4.02395E-003
-3.0	5.50413E-003	4.5	3.42479E-003
-2.5	8.29339E-003	5.0	3.03804E-003
-2.0	1.72478E-002	8.0	2.67837E-003
-1.8	1.86379E-002	10.0	1.34297E-003
-1.6	2.45416E-002	15.0	9.26605E-004
-1.4	3.74167E-002	20.0	5.11045E-004
-1.2	5.35547E-002	30.0	3.61402E-004
-1.0	7.78040E-002	35.0	2.58117E-004
-0.8	1.23653E-001		2.44302E-004
-0.6	2.10034E-001		
-0.4	6.26101E-001		
-0.2	4.11022E-002		
-0.1	1.64062E+002		
0.0	2.31664E+005		
0.1	5.16414E+002		
0.2	1.71697E+001		
0.4	4.52494E-001		



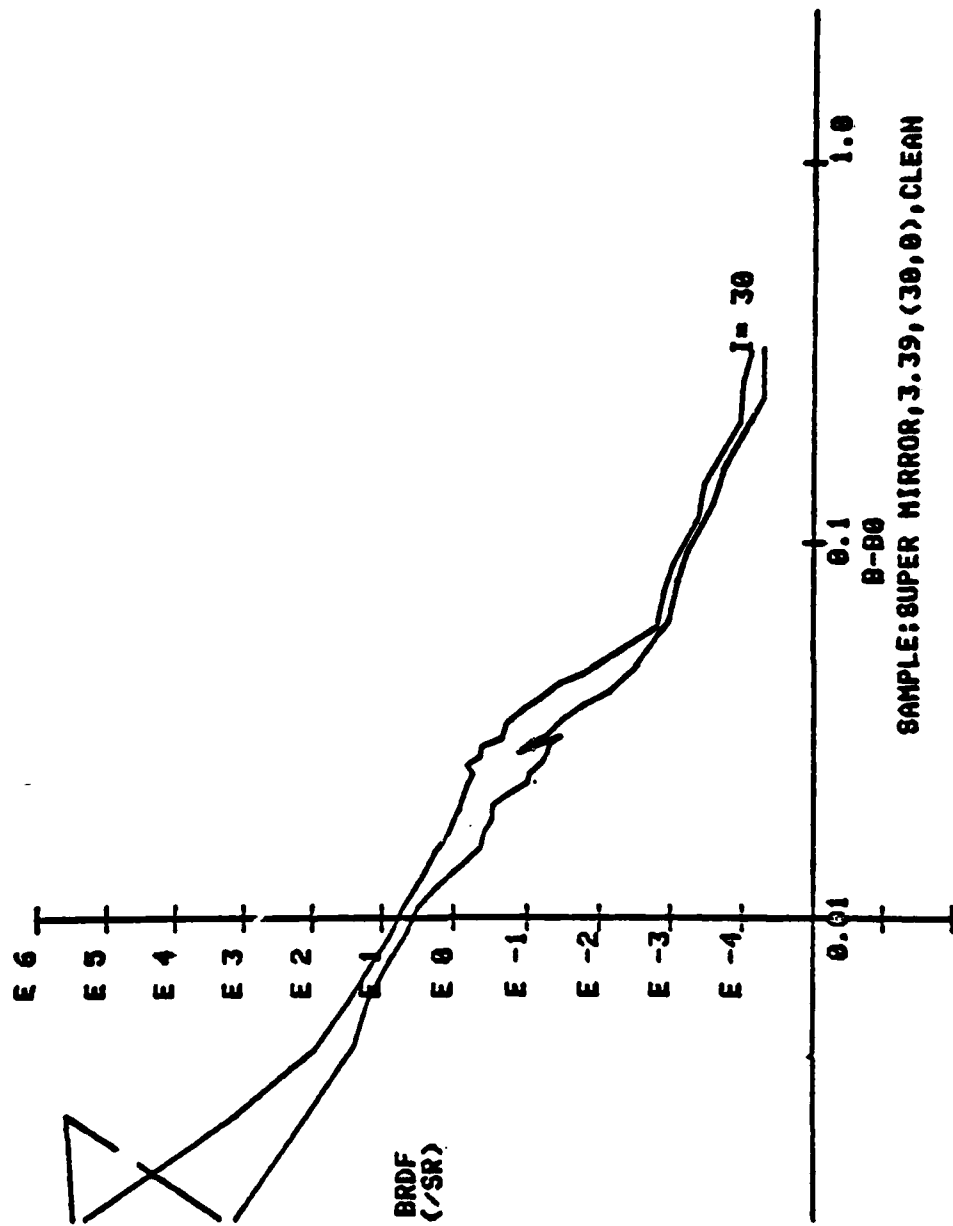
SUPER MIRROR, 3.39, (10,0), AFTER CLEANING

ANG. FROM SPEC	BRDF(/SR)	ANG. FROM SPEC	BRDF(/SR)
-3.2	2.27334E-003	0.4	1.77153E+001
-3.0	3.19631E-003	0.5	1.11905E+001
-2.8	4.61207E-003	0.6	5.07969E+000
-2.6	7.07501E-003	0.7	3.85945E+000
-2.4	1.61261E-002	0.8	2.37010E+000
-2.2	3.55927E-002	0.9	1.87882E+000
-2.0	5.75426E-002	1.0	1.22761E+000
-1.8	1.31909E-001	1.1	9.49001E-001
-1.7	1.84966E-001	1.2	7.43341E-001
-1.6	3.71876E-001	1.3	5.98762E-001
-1.5	5.92812E-001	1.4	5.54161E-001
-1.4	2.35459E-001	1.5	4.01946E-001
-1.3	3.19954E-001	1.6	3.61731E-001
-1.2	4.56353E-001	1.7	3.00554E-001
-1.1	6.40254E-001	1.8	2.61771E-001
-1.0	1.26159E+000	1.9	3.36063E-001
-0.9	1.82395E+000	2.0	2.61964E-001
-0.8	2.75895E+000	2.2	1.59793E-001
-0.7	4.12476E+000	2.4	9.99466E-002
-0.6	7.13078E+000	2.6	4.71988E-002
-0.5	1.00358E+001	2.8	2.87795E-002
-0.4	2.68789E+001	3.0	1.90973E-002
-0.3	7.53129E+001	3.2	1.22197E-002
-0.2	4.31953E+002	3.4	5.33093E-003
-0.1	7.95203E+004	3.6	1.63200E-003
0.0	3.57952E+005	3.8	1.31928E-003
0.1	1.44117E+003	4.0	1.13209E-003
0.2	2.33203E+002	4.5	1.05068E-003
0.3	4.41990E+000	5.0	8.90570E-004
		5.5	7.40751E-004
		6.0	5.90253E-004
		7.0	3.95342E-004
		8.0	3.07916E-004
		9.0	2.90362E-004
		10.0	2.14252E-004
		12.0	1.18441E-004
		14.0	1.13531E-004
		16.0	8.14550E-005
		18.0	6.21877E-005
		20.0	6.34020E-005
		25.0	3.72394E-005
		30.0	7.96421E-006



SUPER MIRROR, 3.39, (20,0) AFTER CLEANING

ANG. FROM SPEC	BRDF(/SR)	ANG. FROM SPEC	BRDF(/SR)
-20.0	6.71103E-005	0.0	3.88481E+005
-15.0	3.67455E-005	0.1	1.68860E+004
-10.0	1.67267E-004	0.2	3.88293E+002
-8.0	2.49490E-004	0.3	6.99414E+001
-6.0	5.03017E-004	0.4	2.46828E+001
-5.0	7.07410E-004	0.5	1.14428E+001
-4.0	1.14877E-003	0.6	6.47597E+000
-3.0	3.77040E-003	0.7	3.92884E+000
-2.0	5.18588E-003	0.8	2.77237E+000
-2.6	8.69517E-003	0.9	1.95919E+000
-2.4	1.63854E-002	1.0	1.42724E+000
-2.2	3.69723E-002	1.1	1.17866E+000
-2.0	3.84894E-002	1.2	8.51217E-001
-1.8	6.01121E-002	1.3	7.37070E-001
-1.6	8.95007E-002	1.4	6.03890E-001
-1.4	2.11654E-001	1.5	5.20904E-001
-1.3	2.79795E-001	1.6	4.18901E-001
-1.2	4.14528E-001	1.7	3.82945E-001
-1.1	4.31799E-001	1.8	3.32748E-001
-1.0	8.30047E-001	1.9	2.82481E-001
-0.9	1.43445E+000	2.0	2.71099E-001
-0.8	2.09313E+000	2.2	1.60123E-001
-0.7	2.97871E+000	2.4	8.71048E-002
-0.6	5.63508E+000	2.6	4.90343E-002
-0.5	8.52774E+000	2.8	2.94503E-002
-0.4	2.05166E+001	3.0	1.80939E-002
-0.3	4.99236E+001	3.2	9.55820E-003
-0.2	1.22320E+002	3.5	1.59665E-003
-0.1	7.53284E+003	4.0	1.28877E-003
		4.5	1.05262E-003
		5.0	8.61650E-004
		6.0	6.31276E-004
		7.0	4.45071E-004
		8.0	3.38577E-004
		10.0	2.53611E-004
		12.0	1.58270E-004
		14.0	1.10386E-004
		16.0	9.80353E-005
		20.0	5.57495E-005
		25.0	5.17632E-005
		30.0	4.74569E-005
		40.0	2.44038E-005
		50.0	5.35139E-005



SUPER MIRROR, 3.39, (30, 0), CLEAN

ANG. FROM SPEC	BRDF(/SR)	ANG. FROM SPEC	BRDF(/SR)
-20.0	4.95685E-005	-0.6	4.57143E+000
-15.0	5.05293E-005	-0.5	7.97424E+000
-10.0	1.68805E-004	-0.4	1.56275E+001
-8.0	2.50043E-004	-0.3	2.47793E+001
-6.0	5.81813E-004	-0.2	1.08665E+002
-5.0	7.94334E-004	-0.1	1.50831E+003
-4.0	1.01819E-003	0.0	3.69938E+005
-3.0	3.30037E-003	0.1	2.87891E+005
-2.8	5.06230E-003	0.2	1.16203E+003
-2.6	7.62776E-003	0.3	8.78472E+001
-2.4	1.69355E-002	0.4	2.81886E+001
-2.2	3.23468E-002	0.5	1.37479E+001
-2.0	5.63035E-002	0.6	7.60401E+000
-1.9	9.06018E-002	0.7	5.36407E+000
-1.8	1.28039E-001	0.8	3.28997E+000
-2.0	3.48251E-002	0.9	2.38900E+000
-1.9	4.81365E-002	1.0	1.79363E+000
-1.8	5.31658E-002	1.1	1.24831E+000
-1.7	6.15306E-002	1.2	1.01511E+000
-1.6	8.98861E-002	1.3	8.43105E-001
-1.5	9.99675E-002	1.4	7.58230E-001
-1.4	1.86784E-001	1.5	6.68024E-001
-1.3	2.95467E-001	1.6	5.48481E-001
-1.2	3.00763E-001	1.7	6.69460E-001
-1.1	3.98058E-001	1.8	4.32432E-001
-1.0	4.33599E-001	1.9	4.15654E-001
-0.9	8.11064E-001	2.0	2.21003E-001
-0.8	1.66861E+000	2.2	1.90340E-001
-0.7	3.25731E+000	2.4	1.11277E-001
		2.6	6.26595E-002
		2.8	3.57826E-002
		3.0	1.61495E-002
		4.0	1.50125E-003
		5.0	1.20656E-003
		6.0	8.74776E-004
		8.0	3.87110E-004
		10.0	3.26533E-004
		15.0	1.03536E-004
		20.0	9.49138E-005
		25.0	7.44566E-005

Army Materials and Mechanics Research Center
Watertown, Massachusetts 02172
SCATTERING MEASUREMENTS OF RAYTRAN ZINC
SELENIDE IN TRANSMISSION AT WAVELENGTHS
OF 0.6328, 3.39, and 10.6 MICROMETERS
F. O. Bartell, A. G. DeBell, E. L. Dereniak,
J. Hubbs, T. Stuhlinger, and W. L. Wolfe
Optical Sciences Center
University of Arizona
Tucson, Arizona 85721
Technical Report AMMRC TR 81-38, August 1981,
157 pp.-illus.-tables, Contract DAAG46-79-M-
0871

D/A Project: 8X363304D215; AMCMS Code:6333.04.21500.05
Final Report, August 1979-April 1981

The transmission scattering of three samples of different thicknesses of zinc selenide were measured. The samples were 1/4", 3/4", and 1" thick. Fifty-four plots of the BTDF were made utilizing the scattering data obtained at .6328, 3.391, and 10.6 μ m.

AD Unclassified
Unlimited Distribution

Key Words
Infrared Optical Materials
Infrared Windows
Forward Scattering
Light Scattering
Zinc Selenide

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Unlimited Distribution

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Infrared Windows
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Zinc Selenide

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SCATTERING MEASUREMENTS OF RAYTRAN ZINC
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OF 0.6328, 3.39, and 10.6 MICROMETERS
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The transmission scattering of three samples of different thicknesses of zinc selenide were measured. The samples were 1/4", 3/4", and 1" thick. Fifty-four plots of the BTDF were made utilizing the scattering data obtained at .6328, 3.391, and 10.6 μ m.

Army Materials and Mechanics Research Center
Watertown, Massachusetts 02172
SCATTERING MEASUREMENTS OF RAYTRAN ZINC
SELENIDE IN TRANSMISSION AT WAVELENGTHS
OF 0.6328, 3.39, and 10.6 MICROMETERS
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Infrared Windows
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