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13. The Gordon Conference on "Ceramics with Superelectrical and Supermechanical Properties" was held from 29 July to 2 August, 1991, at the Holderness School in Plymouth, New Hampshire. The conference had ninety-eight participants: approximately ten percent were from foreign countries including representatives from Great Britain, japan and Aust alia. The topics discussed included: how to achieve super-responses in ceramic materials by engineering of structural instabilities, spin-glass models of relaxor ferroelectrics, engineering of super-tough ceramics in zirconias, smart materials and structures, engineering and modeling of ferroelectrics for high strain actuators, small particle size effects in ferroelectrics, ferroelectric thin films for memory and optical applications, processing and properties of nanophase ceramics, microstructure-property relationships in ceramic superconductors and fundamental aspects of phase transformations in ceramics. New results and new directions were presented and thoroughly discussed.

AFOSR-91-0311

1991 GORDON RESEARCH CONFERENCE ON SOLID STATE STUDIES IN CERAMICS

Final Progress Report

The Gordon Conference on "Ceramics with Superelectrical and Supermechanical Properties" was held from 29 July to 2 August, 1991, at the Holderness School in Plymouth, New Hampshire. The conference had ninety-eight participants: approximately ten percent were from foreign countries including representatives from Great Britain, Japan and Australia. There were scientists from universities, national laboratories and private industries, including young scientists and graduate students as well as established scientists.

The program for the conference brought together people working in electrical and mechanical behavior of ceramics as well as phase transformations. The topics discussed included: how to achieve super-responses in ceramic materials by engineering of structural instabilities, spin-glass models of relaxor ferroelectrics, engineering of super-tough ceramics in zirconias, smart materials and structures, engineering and modelling of ferroelectrics for high strain actuators, small particle size effects in ferroelectrics, ferroelectric thin films for memory and optical applications, processing and properties of nanophase ceramics, microstructure-property relationships in ceramic superconductors and fundamental aspects of phase transformations in ceramics. New results and new directions were presented and thoroughly discussed.

There was one poster session in which thirty-two posters were presented. Several of the attendees commented on the high quality of the posters. In general, many of the conferees commented that this conference was highly successful and worth attending.

C - Cottage
E - Elkins
H - Hoit
Ha - Hammond
K - Kesler
L - Livermore

GORDON RESEARCH CONFERENCES
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Ceramics, Solid State Studies in
July 28 - August 2, 1991

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GORDON CONFERENCE ON CERAMICS 1991

July 29 - August 2, Holderness School, NH

Theme: Ceramics with Super Electrical and Super Mechanical Properties

Chairman: Martin P. Harmer
Vice Chairman: Edwin R. Fuller, Jr.

Program Speakers

Monday, July 29

a.m. SUPER ELECTRICAL PROPERTIES OF CERAMICS AND PHASE TRANSFORMATIONS.
Discussion Leader - D. M. Smyth

L. E. Cross - "Possibilities for Super-Responses in Ceramic Materials"

J. Krumhansl - "Physics, Phenomenology and Meso Structures in Displacive Transformations"

p.m. SUPER MECHANICAL PROPERTIES OF CERAMICS AND PHASE TRANSFORMATIONS
Discussion Leader: R. Stevens

A. H. Heuer - "Supertough Transformation Toughened Zirconia Ceramics"

N. MacMillan - "Limits to the Mechanical Properties of Solids"

Tuesday, July 30

a.m. SMART CERAMICS AND ACTUATORS
Discussion Leader: D. Readey

C. Rogers - "Intelligent Material System: Recent Progress and Research Needs

A. Bell - "Tailoring of Materials for Actuator Applications"

p.m. SUPER SENSORS AND FINE-SCALE FERROELECTRICS
Discussion Leader: H. Tuller

R. W. Whatmore - "Ferroelectric Ceramics for Uncooled High Performance Thermal Imaging"

K. Uchino - "Ferroelectric Properties of Ultrafine Particle/Grain Size Ceramics"

Wednesday, July 31

a.m. SUPER DIELECTRIC THIN FILMS
Discussion Leader: D. Dimos

J. F. Scott - "Ceramic Ferroelectric Thin Film Memories"

A. Kingon - "Multicomponent Oxide Thin Films: The Achievable and Future Possibilities"

p.m. SUPERCONDUCTING CERAMICS
Discussion Leader: T. M. Shaw

D. C. Larbalestier - "Critical Issues for Critical Currents in High Temperature Superconductors"

N. Alford - "Microstructure-Property Relationships in High T_c Superconductors"

Thursday, August 1

a.m. SUPER PROPERTIES BY NANOSCALE PROCESSING
Discussion Leader: H. M. Chan

K. Niihara - "Superstrong Ceramics By Nanodispersion Strengthening"

R. P. Averback - "Sintering and Deformation Properties of Nanophase Ceramics"

p.m. After Dinner Speaker - A. W. Pense, Provost
"Super Surprises in Engineering Materials"

Friday, August 2

a.m. PHASE TRANSFORMATIONS
Discussion Leader: R. M. Cannon

A. G. Khachaturyan - "Structure Transformations During Ordering and Decomposition Reactions"

P. Clapp - "Nucleation of Martensite in Ceramic Systems"