PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	January 8, 1994	Technical Report

4. TITLE AND SUBTITLE
Transition Metals in Highly Correlated Discotic Phases: Designing Metallomesogens With Selected Intermolecular Organizations

5. FUNDING NUMBERS
N00014-92-J-1416
R&T Code
400X098YIP01

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8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
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800 North Quincy Street
Arlington, VA 22217-5000

10. SPONSORING/MONITORING AGENCY REPORT NUMBER
Technical Report No. 4

11. SUPPLEMENTARY NOTES
Chemistry of Materials in press.

12a. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. ABSTRACT (Maximum 200 words)

Diketonate Schiff-base complexes were investigated, and the square planar derivatives (M=Ni, Cu, Pd) were found to display discotic hexagonal disordered phases (D_{hd}). The M=VO analogs are not liquid crystalline. None of the complexes can exhibit a disc-shape independently, and in the mesophase they must organize into a superstructure which on time average leads to antiparallel alignment of nearest neighbors. These discotic antiphases exhibit a number of important properties including low melting points, low viscosity, and close intermolecular contacts of 3.6Å. Additionally when put between two untreated slides, these mesophases were found to readily align with the column axes perpendicular to the surfaces. The Cu and Ni complexes exhibited very similar mesophases and lattice constants whereas the Pd complexes displayed larger intercolumnar distances and higher clearing temperatures. The differences are ascribed to greater intermolecular associations displayed by the Pd complexes. X-ray diffraction studies revealed the Ni and the Cu complexes to have an additional halo centered at ≈7.2Å which may be the result of a doubling of the period along the column axes resulting from the antiparallel arrangement of the antiphase superstructure.

14. SUBJECT TERMS			15. NUMBER OF PAGES
			16. PRICE CODE NA
17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	Unlimited

OFFICE OF NAVAL RESEARCH

Grant N00014-92-J-1416

R&T Code 400X098YIP01

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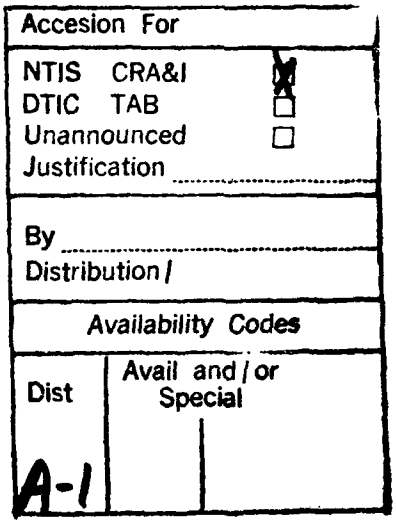

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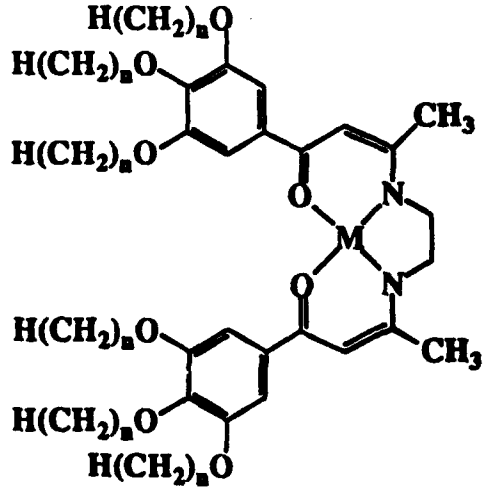
Abstract:

The diketonate Schiff-base complexes shown below were investigated, and the square planar derivatives (M=Ni, Cu, Pd) were found to display discotic hexagonal disordered phases (D_{hd}). The M=VO analogs are not liquid crystalline. None of the complexes can exhibit a disc-shape independently, and in the mesophase they must organize into a superstructure which on time average leads to antiparallel alignment of nearest neighbors. These discotic antiphases exhibit a number of important properties including low melting points, low viscosity, and close intermolecular contacts of 3.6Å. Additionally when put between two untreated slides, these mesophases were found to readily align with the column axes perpendicular to the surfaces. The Cu and Ni complexes exhibited very similar mesophases and lattice constants whereas the Pd complexes displayed larger intercolumnar distances and higher clearing temperatures. The differences are ascribed to greater intermolecular associations displayed by the Pd complexes. X-ray diffraction studies revealed the Ni and the Cu complexes to have an additional halo centered at ≈7.2Å which may be the result of a doubling of the period along the column axes resulting from the antiparallel arrangement of the antiphase superstructure.



M=Ni n=12
M=Cu n=10,12,16
M=Pd n=10, 12
M=VO n=10, 12