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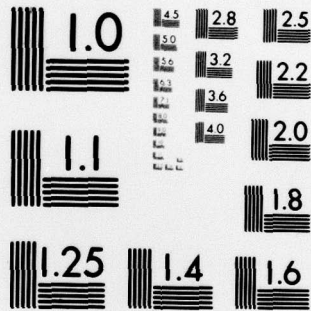
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Polymer Attached Catalysts

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FINAL REPORT
1 Mar - 31 Aug '79

Robert H. Grubbs

7 January 1980

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U. S. Army Research Office

Contract Number DAAG 29-79-C0051

California Institute of Technology
Pasadena, California 91125

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Polymer Attached Catalysts		5. TYPE OF REPORT & PERIOD COVERED Final-- 3/1/79-8/31/79
7. AUTHOR(s) Robert H. Grubbs		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS California Institute of Technology Pasadena, California 91125		8. CONTRACT OR GRANT NUMBER(s) DAAG-29-79-C0051 ²
11. CONTROLLING OFFICE NAME AND ADDRESS U. S. Army Research Office Post Office Box 12211 Research Triangle Park, NC 27709		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		12. REPORT DATE January 7, 1980
		13. NUMBER OF PAGES 4
		15. SECURITY CLASS. (of this report) Unclassified
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited.		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report) NA		
18. SUPPLEMENTARY NOTES The view, opinions, and/or findings contained in this report are those of the author(s) and should not be construed as an official department of the Army position, policy, or decision unless so designated by other documentation.		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Polymer Nickel Monomer Preparation Phosphine Rhodium		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Monomers containing two ligand groups separated by either flat aromatic groups or long alkyl chains were prepared. These materials were use to make polymers in with nickel(II) or \oplus -rhodium(I) halides were used to link the monomer units. The major part of the study used 1,12-bis(diphenylphosphino)-dodecane as the monomer unit. Polymethylmethacrylate-Pt \rightarrow next page		

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ABSTRACT (contd)

composits were evaluated as oxidation catalysts and as electrode coatings.

PUBLICATIONS (from DOD support)

S. C. H. Su and R. H. Grubbs, "Enzymic and Non-Enzymic Catalysis," Plenum Press, in press.

R. H. Grubbs, S. C. H. Su, and S. Swetnick, Report No. 281, Du Centre Nat. de la Recherche Scientifique, CNRS, 1979.

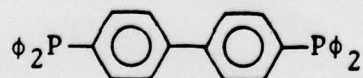
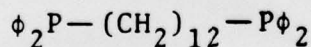
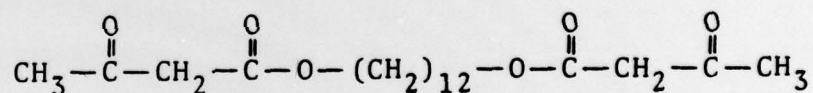
SCIENTIFIC PERSONNEL

Gwen Goretsas - M.S. student

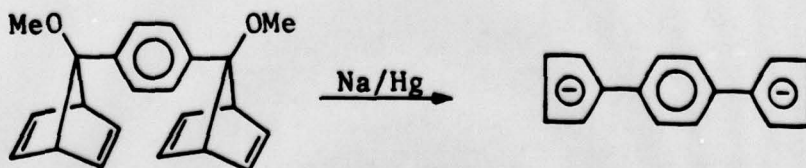
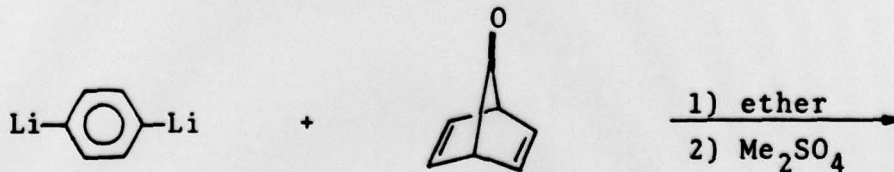
AREAS OF ADVANCEMENT

Preparation of Ligating Monomers

Monomers containing two ligating groups separated by distances greater than that favorable for chelation on one metal center were prepared. These included the following:



Attempts were made to prepare the following cyclopentadienyl monomer from the norbornadienyl precursors:



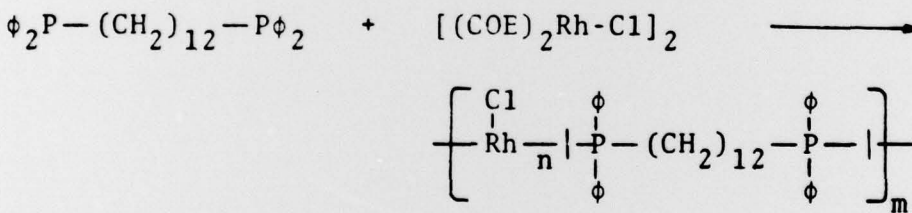
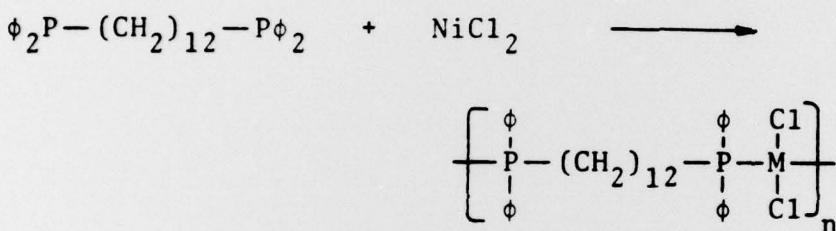
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Good preparations of the ethers were developed, however, clean conversion to the monomer were not achieved due to the lack of time.

Polymer Formation

Polymers were prepared from the bisphosphine and nickel and rhodium halide salts. These insoluble polymers showed the appropriate analysis and were of the proper color for the desired polymers.



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n = 1, 2 or 3; m = large

Further characterization and the development of these materials as catalysts must await further support.

Polymer Imbeded Metals

Materials can be prepared containing mixed valent metal salts in a variety of polymeric matrices. The most stable of these, polymethylmethocrylate-Pt, was evaluated for the oxidation of sulfides and as an electrode coating.

Oxidations

The ethanol insoluble material produced from polymethylmethocrylate and PtCl₂/MeOH was tested for the oxidation of various sulfides at one atmosphere of O₂ and temperatures up to 60°C. None of the sulfides showed any enhanced oxidation rates.

Electrochemistry of Polymer Coated Electrodes

A preliminary examination of these materials as coatings on graphite electrodes was carried out. These studies suggest that the polymer containing platinum can change the characteristics of a carbon electrode toward those of a standard platinum electrode.