Structural Synergism in Functionalized Polymers:
New Catalysts for Transacylation Reactions of Derivatives
of Carboxylic and Phosphoric Acids

Wilmer K. Fife
Martel Zeldin
Department of Chemistry
Indiana University-Purdue University at Indianapolis
1125 East 38th Street
Indianapolis, IN 46205

June 1, 1991

Reproduced From
Best Available Copy
Structural Synergism in Functionalized Polymers: New Catalysts for Transacetylation Reactions of Derivatives of Carboxylic and Phosphoric Acids

Wilmer K. Fife and Martel Zeldin

Indiana University-Purdue University at Indianapolis
Department of Chemistry
1125 East 38th Street
Indianapolis, IN 46205

Office of Naval Research
Department of the Navy
Arlington, VA 22217-5000

The final report summarizes the goals, accomplishments and personnel associated with this project.
I. Description of Project

This project has focused on the development of new highly-efficient, selective catalysts for widely-used commercial and biological reactions of carboxylic and phosphoric acids and their derivatives. The first phase of the project included the design and synthesis of linear, water-soluble polymers that are expected to self-organize in aqueous solution to form lipophilic substrate-binding domains adjacent to catalytic sites effective in transacylation reactions. Progress toward these objectives was summarized in End-Of-The-Year Report dated May 21, 1990.

The second phase of this work has dealt with the continuing evaluation of synthetic catalysts and the development of new methods for detailed structural characterization of these polymeric materials. Prof. R.G. Cooks (Purdue University, West Lafayette, IN) has been a key collaborator in this effort. The ultimate aim of this phase of the investigation is to ascertain the limits of substrate-selectivity for linear, synthetic polymeric catalysts. Progress toward these goals is summarized in End-Of-The-Year Report dated May 21, 1991.

II. Summary of Accomplishments

The major accomplishments are summarized in Section Part II (e) of the End-Of-The-Year Reports of 1990 and 1991. Details of the investigation to-date are contained in seven papers published in refereed journals, one patent, four non-refereed papers and fourteen ONR technical reports. These papers are summarized by author, title and journal below:

A. Papers Published in Refereed Journals


B. Patents Granted


C. Technical Reports Published (ONR Technical Reports) and Papers Published in Non-Refereed Journals


No. 3, 3 pages). Additional support is acknowledged from Reilly Industries, Indianapolis, IN.


7. Prema Ranganathan, Wilmer K. Fife and Martel Zeldin, "Thermal Properties of N-Substituted 4-Vinylpyridinium Ions and Their Polymers," (ONR Technical Report No. 5, 11 pages). Additional support is acknowledged from the National Science Foundation for funds to purchase thermal analysis equipment (Grant No. CHE 84-10779).


D. Personnel

1. Post-Doctoral Fellows:  
   Ying Hu (Full)  
   Prema Ranganathan (Full)  
   Slawomir Rubinsztajn (Full)

2. Graduate Students:  
   Eric Granger (Partial)  
   Laurie Lawin (Full)  
   Carol Parish (Partial)  
   Yue Xin (Partial)  
   Zheng-Yun Zhan (Partial)

3. Undergraduate Students:  
   Martin Kuntz  
   Michael Ranjbar  
   Donica Schwomeyer