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13. ABSTRACT *(Maximum 200 words)*

Includes a recapitulation of the research carried out during the time period of the Grant listed above, plus a complete list of 112 Technical Reports, 23 Patents Filed a/o Issued, and a complete listing of all personnel paid in whole or in part by the grant (and the previously "connected" Contract No. N00014-86-K-0766 covering period 9-16-86 to 10-31-89).

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"Polymers By Non-Redox Processes: Synthesis, Physical Studies and Application"

FINAL REPORT

NOVEMBER 1, 1989 - JUNE 30, 1992

[NO-COST EXTENSION TO DECEMBER 31, 1992]

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The work covered by this grant (Grant No. N00014-90-J-1559) is a continuation of the work supported by Contract No. N00014-86-K-0766.

The work covered by the grant from November 1, 1989 to June 30, 1992 is summarized by the Technical Reports listed below.

Patents carried by both Contract No. N00014-86-K-0766 and Grant No. N00014-90-J-1559 are listed below.

Also listed are the names of all personnel who received stipends resulting in whole or in part from funds available either from the contract, the grant, or from both.

NOTE: Work covered by the Contract No. N00014-86-K-0766, from September 16, 1986 to October 31, 1989, is described by publications included the Final Report for Contract No. N00014-86-K-0766.

SUMMARY:

This interdisciplinary research involving synthetic chemistry, electrochemistry, structural studies and physics has involved the conducting polymer, polyaniline, and its derivatives almost exclusively. It has proven to be enormously successful and has been probably the underlying force in taking the polyaniline field of conducting polymers from more or less a laboratory curiosity to technical production and sales. At the commencement of the project, the constitution of this varied oxidation state class of conducting polymers, their chemical purity and oxidative purity were unclear. The analytically and oxidatively pure three distinct oxidation states have been synthesized and characterized. Free-standing stretch-aligned partly crystalline films and fibers with greatly enhanced conductivity have been obtained, thus demonstrating for the first time the processibility of polyaniline and its derivatives. Structural, magnetic, optical and transport studies have shown that doped polyaniline has a half-filled polaron conduction band and that it possesses metallic-type conductivity in its crystalline domains.

Alan G. MacDiarmid
December 4, 1992

112 TECHNICAL REPORTS
&
23 PATENTS

SUPPORTED IN WHOLE OR IN PART
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11/1/89 THROUGH 6/30/92

GRANT NO.: N00014-90-J-1559

"POLYMERS BY NON-REDOX PROCESSES: SYNTHESIS, PHYSICAL STUDIES AND APPLICATION"

NOVEMBER 1, 1989 to JUNE 30, 1992

No-Cost Extension to DECEMBER 31, 1992

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6. Montclair State College
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8. Rensselaer Polytechnic Institute
   Department of Chemistry (G.E. Wnek)

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