AN INVESTIGATION OF THE ELECTROCHEMICAL BEHAVIOR
OF GRAPHITE FIBER-POLYMER COMPOSITES

FINAL REPORT
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Submitted by:
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Submitted to:
Department of the Army
Metallurgy and Materials Science Division
U. S. Army Research Office
P. O. Box 12211
Research Triangle Park, NC 27709
Attention: Mr. Richard O. Ulsh
Chief, Information Processing Office

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RESEARCH LABORATORIES FOR THE ENGINEERING SCIENCES
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An Investigation of the Electrochemical Behavior of Graphite Fiber-Polymer Composites

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The factors influencing the use and stability of graphite fiber polymer matrix composite electrodes have been determined. Several possible uses of these electrodes have been examined for scientific feasibility.
SECTION I: STATEMENT OF PROBLEM(S) STUDIED

The factors influencing the performance and stability of graphite fiber polymer matrix composites were investigated. These factors were:

1) Matrix material
2) Fiber alignment
3) Fiber modulus
4) Electrochemical waveform
5) Solution composition

These variables were examined extensively and reported on in the first three (semiannual Progress) Reports. 1-3

The second phase of the three-year study concentrated on examining the use of graphite fiber-polymer matrix composites for applications which have potential value to the Department of Defense. These studies were basic in nature and concerned with scientific feasibility for performing specific research tasks. These areas were:

1) Electrochemical Disinfection
2) Electrochemical Regeneration of Enzyme Cofactors
3) Electrochemical Breakdown of Chemical Wastes
4) Use of Composite Electrodes for Antifouling Purposes

The results of these studies were encouraging and, as a result of their being presented at several U.S. Army Conferences, have generated several possibilities for future work within the Army. These results are contained in the last three semi-annual progress reports 4-6 plus two trip reports. 7,8
SECTION II: REPORTS


7) A report to Dr. John Hurt, dated November 4, 1980, reporting on our participation at the third annual composites review (ARO/AMMRC Workshop in Watertown, Mass). Also a follow up report to Dr. Hurt dated December 1, 1980.

8) A report to Dr. Robert Reeber, dated November 30, 1981, documenting our activities at the CSL conference at Aberdeen Proving Ground, November 16-18, 1981. This report also contained the results of a trip to U.S. Army MERADCOM, Fort Belvoir, Virginia, on November 23, 1981.

SECTION III: PERSONS SUPPORTED ON CONTRACT

G. E. Stoner
G. L. Cahen, Jr.
G. R. Stafford
S. M. Lipka
SECTION IV: GRADUATE DEGREES EARNED


SECTION V: PUBLICATIONS

1) Stafford, Gery Ryan, Ph.D. Dissertation, University of Virginia, 1980.


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