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AROMATIC CONDUCTING POLYMERS. (U)
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TECHNICAL REPORT NO. 1

Aromatic Conducting Polymers.

by

James C.W. Chien and C. Peter Lillya

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October 1981

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Annual Report (October, 1981)

Aromatic Conducting Polymers (Contract #N00014-80-C-0756)

Principal Investigators: James C. W. Chien and C. Peter Lillya

Interests in electrically conducting polymers have grown from polyacetylene to other polymers. One of the objectives of this research project, initiated this year, is in elucidating structure-conductivity relationships for new aromatic polymers.

The following model compounds and polymers have been synthesized: poly(2,5-dimethoxy-phenylene-vinylene), para-trans-trans-distyrylbenzene, meta-trans-trans-distyrylbenzene, trans-poly(phenylene-vinylene) both by Wittig reaction and by NaH synthesis, cis- and trans-poly(phenylene-vinylene) also by both methods, trans-1,4-bis-4-phenylbutadienylbenzene, cis- and trans-1,4-bis-4-phenylbutadienylbenzene, poly-(p-diethynylbenzene) of 4 different molecular weights, poly(m-diethynylbenzene), poly(m-phenylene-vinylene), poly(m- and p-phenylene-vinylene) and trans-stilbene.

Conductivity of the above materials had been obtained before and after AsF₅ doping. The conducting properties are related to: (1) cis, trans structure, (2) molecular weight, (3) method of synthesis, (4) meta and para substitution, and (5) bond alteration.

The formation of radical cations upon AsF₅ doping and subsequent chain extension in these materials are studied by electron paramagnetic resonance for linewidth, g-values, spin concentration and their temperature dependence.

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