

### Justification

The conducting polymer field can only advance technologically by performing processing studies such as those described above for conventional polymers. In order to carry out such studies, however, it is first necessary to have available a relatively large supply of conducting polymer in some specified form defined by a rigid set of specifications.

### Status

Only within the last few months has real progress been made in attaining the above objectives. Soluble, processable forms of polythiophene have been synthesized and polypyrrole emulsions with a latex base have been produced from which conducting films of polypyrrole have been cast. Composites of polypyrrole or polythiophene in poly(THF) have been synthesized electrochemically. No such studies have been reported with the title compounds. Only in the case of polypyrrole is there any suggestion that a conducting polymer has been made on a sufficiently large scale with rigid specifications to permit studies of the type described above.

### Research Proposed

A technologically processable polymer can in principle be found, and control of mechanical properties can be imparted by:

- (i) The formation of co-polymers of the title compounds with a conventional polymer.
- (ii) The replacement of H atoms in the title polymers with substituent groups which are themselves polymerizable under appropriate conditions.
- (iii) The use of polymeric dopant ions. If the polymeric ion constitutes a large portion of the final polymer, the resulting material is, in effect a homogeneous blend. Each of these three types of research should be actively pursued.
- (iv) Relatively large quantities of selected conducting polymers adhering to a rigid set of specifications should be synthesized for certain of the studies listed at the beginning of this section, 1.4.