

particularly important candidate for further investigation since more detailed studies, when combined with those already performed, will hopefully provide sufficient information to answer the fundamental question "why do conducting polymers conduct?" When the amount of knowledge concerning the other conducting title polymers is similar to that for  $(CH)_x$  it is highly probable that several technological uses for conducting polymers will thereby be defined clearly.

#### Research Proposed

(i) Emphasis should first be placed on ascertaining the chemical purity, uniformity of composition and structure, and overall homogeneity of the doped and non-doped forms of the title polymers.

(ii) Determination of the effect of molecular weight, conjugation length, degree of crystallinity, etc. on the bulk conductivity of the title polymers.

(iii) Synthesis of selected derivatives of the title polymers in order to ascertain the effect of certain types of substituents on the polymer chain on the above properties.

#### 1.2. Doping Mechanism and the Effect of Dopant Ion on Chemical, Electronic and Mechanical Properties

##### Scope

This research area is concerned with (i) determining the doping mechanism which results in the conductivity of the organic polymer being increased by many orders of magnitude and (ii) the effect of the nature of the dopant anion or cation on the following properties of the doped and undoped polymer:

- . bulk conductivity
- . structural homogeneity (e.g. cis-or trans-isomeric forms, etc.)
- . molecular weight
- . conjugation length
- . relative amounts of crystalline and amorphous regions