molecular weight, and conjugation length. Characterize the aggregation of polymer chains and dopant arrays in both crystalline and amorphous regions of the polymer. A focus here should be on derivation of equilibrium structures for the crystalline components, the nature of crystallite aggregation, and the morphological relationship of crystalline and amorphous components.

## Justification

While methods might be developed which lead to conducting polymers having single crystal perfection, the materials having the greatest applications potential are expected to be the lower cost compositions which are disordered. Understanding the defect and crystallographic structures of these materials could be the key for design engineering to meet applications needs.

## Status

Little detailed information is presently available even for the most thoroughly investigated conducting polymers concerning (1) crystallographic structures, (2) morphology, (3) the nature of polymer chain irregularities, and (4) average conjugation length and the distribution of conjugation lengths.

## Research Proposed

(1) Increased application of advanced methods for structure determinations is proposed, including EXAFS measurements to determine local structure, the combination of electron, x-ray, and neutron diffraction on the same samples, and high resolution electron