not as well developed. The processing of conducting materials for evolutionary reasons is the least well understood area.

The physics of conducting polymers, although intensely studied, remains in some areas controversial. This is especially true for morphologically related phenomena. For example, the importance inter vs. intra particle size and contacts or molecular weight as well as morphological variations on conductivity are not well understood. Microscopic phenomena such as the role of solitons, polarons, and bipolarons are also not universally accepted.

Environmental stabilities of these materials are essential properties which limit their application. Recent studies have begun to understand the factors which control their thermal, oxidative, hydrolytic as well as chemical stabilities. Likewise reliable reproducable preparation of samples large enough to enable commercial evaluation for possible products has only been achieved for a few materials. For these reasons there. are currently only a limited number of commercial applications of these materials. Nonetheless, an example where a conducting polymer is used is in a commercial xerographic copier. The substantial work aimed at developing an organic battery, has yet to lead to a commercial success.

PROPOSED RESEARCH

The Study Group did not want propose developmental research aimed at a specific product and prefered to identify areas of general research that, if successful, could ultimately be used to exploit applications. These are:

1) Understanding the chemistry and physics of composites including active/passive homogeneous and/or hetereogeneous blends. 2) Fundamental understanding and characterization of single polymeric units vs. aggregates. This includes understanding of the conductivity of highly ordered vs. disorder systems as well as the study of interface phenomenon of conducting materials with classical inorganic conductors, semiconductors, and insulators. 3) Developing capabilities to control morphology and understand its effect on ionic and electron transport. 4) Improve characterization capabilities for conductive polymers. 5) New synthetic endeavors include the development of highly ordered polymeric systems with controlled morphology, intrinsic conductors (especially pyropolymers) and controlled properties via electrochemical techniques. The synthesis needs also extends to blends and composites. 6) Processing and synthetic scale up technologies will also be important to assure availability of interesting materials for commercial evaluation.