formulations. All four of the disciplines indicated in the tetrahedron participate, although not equally, in each of these areas. The study group focused on four broad categories including novel materials and design methods analytical methods, physical properties, and theory. The objective was to take the broad view of problems in the field and a long term look into the future. No attempt was made to prioritize the areas or the research topics given the amount of time available. In general, a healthy conductive material science requires progress in each of these four areas and contributions from chemistry, physics, application and theory. The following summaries address scope, justification, status and research needed for each of the four topics.

## 1.1 Novel Materials and Design Methods

### Scope

Conductive materials science is driven by the development and synthesis of novel polymeric or molecular materials which are electron and sometimes ion conducting systems and/or have magnetic or optical properties that are unusual. The development of systems with desirable environmental, mechanical, or processing parameters is also an objective.

### Justification

The development of conductive materials science is in many ways materials limited. The design and synthesis of new materials and novel synthesis of established materials is a way of building on the present understanding of conductive materials. In testing of the many current concepts, development of the design criteria for the synthesis of materials with the desired electrical, magnetic, optical, and mechanical properties is an ultimate goal.

### Status

A considerable information base has already been built based on the study of polymers such as polyacetylene and charge transfer salts such as TTF-TCNQ. The recent development of new conducting polymers such as polypyrrole blends with latex and similiarly the development of new superconducting charge transfer salts demonstrate the beginning of the ability to design new materials with tailored properties. However this is only the beginning.