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## Foreword

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The first NASA Space Electrochemistry Research and Technology Conference (SERT) was held at the Lewis Research Center on April 14 - 16, 1987. The conference was conducted on behalf of NASA Headquarters' Power and Propulsion Division (Code RP) of the office of advanced Space Technology (OAST). The conference was designed to identify and assess the critical needs and technologies aimed at providing NASA with guidance on the appropriate direction and emphasis of the electrochemical energy conversion and storage program within the Agency.

In the absence of electrochemical devices, there would be no space program; past, present, or future. The much maligned, and not-too-well understood, field of electrochemistry has shown itself to be an indispensable, if not always a completely reliable, segment of an overall power system. Disposable primaries, long life rechargeable secondaries, and chemically rechargeable fuel cells all play an important role in today's, as well as tomorrow's, space program. With the wide variety of electrochemical system concepts that are in various stages of development, and the diverse set of future NASA mission requirements, it is necessary to consider what system concepts may best suit the Agency's needs.

The field of electrochemistry is so broad and varied that what is the best type of system for one mission may not be best for another. Advocates, on the other hand, generally view their own favorite technology as ideally suited for almost any mission that presents itself. By bringing together a proper mix of mission planners, technology advocates, and power system engineers, a certain degree of focusing does take place.

The areas of emphasis at this meeting, were as follows:

- (1) Advanced rechargeable batteries
- (2) Advanced concepts
- (3) Critical electrochemical issues
- (4) Modeling.

The conference opened with a group of presentations that covered the different classes of Agency missions. Technical papers grouped into one of the four different areas of emphasis were then presented. The sets of mission requirement papers were carefully selected to cover all the different NASA missions classes (Space Station, Low Earth Orbit (LEO), Geosynchronous Orbit (GEO), Planetary, and Space Transportation) as well as perspectives from the Aerospace Corporation and the Air Force. The technical sessions were all chaired by individuals recognized as being both highly respected

investigators and extremely knowledgeable in the practical aspects of complete electrochemical system considerations. These individuals were responsible for assembling their own technical session as well as chairing the workshop period that followed.

The majority of the technical papers presented at the conference comprise this special issue.

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