

# **HYDROGEN ENERGY PROGRESS-IV**

Proceedings of the 4th World Hydrogen

Energy Conference, California, USA

13-17 June 1982

Editors

T. N. VEZIROGLU

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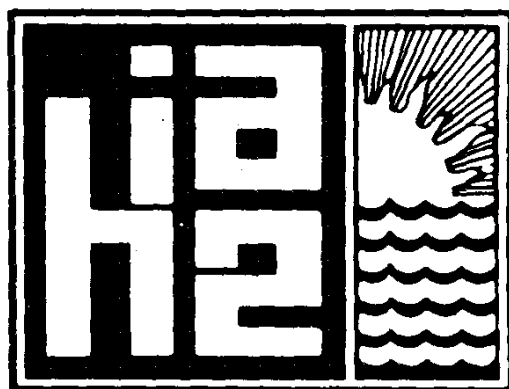
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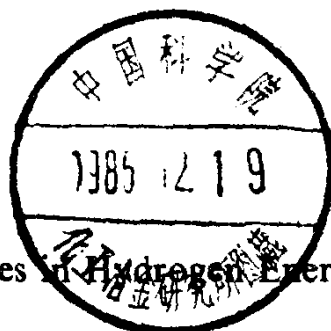
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Pasadena, California  
United States of America  
13-17 June 1982**

**Edited by:**

**T.N. Veziroglu  
W. D. Van Vorst  
J. H. Kelley**

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We wish to extend our appreciation to the Keynote speaker and to the Plenary Session speakers. The Technical Program Committee is due a particular acknowledgement, as are the authors whose papers form the substance of these Proceedings. We wish to thank the organizers, chairpersons and co-chairpersons of the technical sessions. Similarly, we wish to acknowledge the efforts of the Exhibit Committee. We also wish to thank those whose exhibits and demonstrations contributed so significantly to the Conference.

We especially thank the Accompaniers Program Committee, whose efforts meant so much to those attendees with other than technical interests.

Finally, we would like to express our appreciation to the staffs of the various institutions who worked so diligently to ensure the smooth running of the Conference and to prepare the camera-ready copy of the Proceedings.

In further acknowledgement of these contributions, committee members are listed on the following pages.

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## FOREWORD

By now the tradition of biennial, international meetings on the general subject of hydrogen energy is well established. In Miami, Zurich, Tokyo and now Pasadena, engineers and scientists from all over the world with an interest in the production, storage, handling, transport and utilization of hydrogen have been brought together to share experiences and contribute to the dissemination of information.

In this Fourth World Hydrogen Energy Conference (WHEC IV), as in previous conferences, the energy-related prospects for hydrogen have been emphasized. In addition, particular stress has been placed on hydrogen technology in current use, as well as emerging technology—including processes, equipment, fuel cells and many other applications. It has been the Conference organizers' philosophy that all parties, including the public, benefit by bringing those engaged in research (with a view toward the future) in contact with today's practitioners in hydrogen technology. Advances in hydrogen production for a synthetic fuels industry, for example, would draw upon and benefit the chemical industry today and could provide a basis for a clean hydrogen energy industry tomorrow.

A key feature of WHEC IV was the exhibition area and the demonstrations designed to convey some appreciation of the real potential of hydrogen as an energy medium. While these displays cannot, of course, be reflected in these Proceedings, it seems appropriate to record them in this Foreword.

An innovation of WHEC IV was the informal "Poster Session." Here authors presented results of their work using posters and engaged in direct discussion with small groups of interested participants. While the over-all ambience cannot be conveyed, the authors have been good enough to prepare their presentations for inclusion in these Proceedings.

The Proceedings of the three previous World Hydrogen Energy Conferences were issued respectively as "First World Hydrogen Energy Conference Proceedings"; "Hydrogen Energy Systems"; and "Hydrogen Energy Progress." Since the World Hydrogen Energy Conferences have established themselves as a regular feature among the energy forums, it seemed appropriate to standardize the title of the Proceedings and identify the conferences by number. Accordingly, these Proceedings have been named "Hydrogen Energy Progress IV."

It is our hope that these Proceedings will serve as the definitive source of information on the current status of progress in hydrogen technology...even as we begin to look forward to World Hydrogen Energy Conference V to be held in Toronto, Canada in 1984.

William D. Van Vorst, Chairman  
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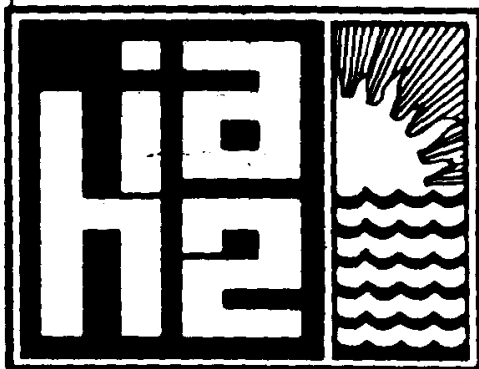
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