

Preface

Fuel processing for fuel cell applications

Fuel cell systems are receiving increasing attention worldwide as more efficient and more environmentally-friendly energy conversion devices. Hydrogen would be the ideal fuel for most fuel cells. On the other hand, there is not yet an infrastructure for wide distribution of hydrogen. Consequently, numerous research groups in the world are actively involved in fuel processing for on-site (stationary) or on-board (mobile) production of synthesis gas and hydrogen for fuel cells. Hydrocarbon fuels, such as natural gas and gasoline, have wide distribution network and thus are promising as fuels for on-board and on-site production of synthesis gas and hydrogen for fuel cells. However, they often contain sulfur compounds that need to be removed, because sulfur can poison the catalysts in fuel processing train and in electrodes. The reformat from hydrocarbon reforming at high temperatures also contain high concentrations of carbon monoxide that must be removed or converted prior to use in low-temperature fuel cells, particularly proton-exchange membrane fuel cells. Alcohol fuels such as methanol have the benefits of being almost sulfur-free clean fuels and easier to reform at lower temperatures, but they do not have the wide distribution network and they possess lower energy density as compared to liquid hydrocarbon fuels. It is thus clear that there are challenges and opportunities as well as certain advantages and disadvantages associated with each type of fuels and the related fuel processing for individual fuel cell systems.

In order to foster the advances in research towards on-site and on-board production of hydrogen by reforming or chemical conversion processing of both hydrocarbon fuels and alcohol fuels, we organized an American Chemical Society (ACS) Symposium on Catalysis in Fuel Processing for Fuel Cell Appli-

cations, as a part of 222nd ACS National Meeting in Chicago, IL, during 26–30 August 2001. This symposium was co-sponsored by ACS Fuel Chemistry Division and Petroleum Chemistry Division. Researchers from many countries participated in this symposium. Twenty-nine papers were presented at the ACS symposium over 3 days. All the authors of the ACS presentations were informed of the opportunity to contribute to the special issue of *Catalysis Today* prior to the ACS meeting.

All the submitted manuscripts were sent to two peer reviewers for evaluation. After the peer review process, 10 of the submitted manuscripts were finally accepted for publication. The final accepted manuscripts cover the following aspects:

- overviews of fuel processing for fuel cells;
- high-temperature reforming of hydrocarbon fuels;
- low-temperature reforming of methanol fuel;
- desulfurization of hydrocarbon fuels for fuel cells;
- CO-free fuel processing for fuel cell applications;
- fuel processing and internal reforming in high-temperature fuel cells;
- catalyst for methanol electrochemical oxidation.

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