

## **SE-34.4 Analysis of a High-Temperature Fuel Cell for Hydrogen Production from Ammonia (S)**

S. Nam<sup>1</sup>, C. Yoon<sup>1</sup>, Y. Jo<sup>1</sup>

<sup>1</sup>Korea Institute of Science and Technology, Seoul

Fuel cells are usually designed to produce electricity and heat. But high-temperature fuel cells, such as solid oxide fuel cells (SOFCs) and molten carbonate fuel cells (MCFCs) can be used as chemical reactors for production of hydrogen in addition to electricity and heat. If hydrogen production reactions are endothermic, then combination of exothermal electrochemical reactions with the hydrogen production reactions leads to higher efficiency and lower investment cost, which might be applied for early-stage hydrogen refueling station. In this study, an anode-supported SOFC was used as a reactor for ammonia decomposition. The cell performance at low hydrogen utilization was analyzed and a cell performance model was developed. By using the mass and energy balances, SOFC reactors producing hydrogen of 20~200 kg/day capacity with electricity suitable for hydrogen compression and cooling could be designed. Similar approach was made to simulate a high-temperature fuel cell for hydrogen production from a liquid organic hydrogen carrier.