

ABSTRACT

The energy shortage and environment deterioration are fundamental challenges for humanity in this century. Therefore, creating the next generation of highly efficient and clean energy-conversion technologies is becoming crucially important. Fuel cells have recently been the focus of intense research and development for powering the next generation of road vehicles, for distributed power generation, as well as for powering small portable devices such as cellular phones and laptop computers. Among various types of fuel cell, the direct alcohol fuel cell (DAFC) is one of the most advanced low-temperature electrochemical device that converts chemical energy of liquid alcohol (such as methanol and ethanol) directly into electrical energy. This lecture will give an overview of the DAFC technology, including its advances, challenges and opportunities. Both actively and passively operated DAFCs will be covered. Some important fundamental issues, such as the development of nano-electrocatalyst and high-performance membranes and coupled heat/mass transport and electrochemical reactions, will be addressed. Some DAFC prototypes will be demonstrated at the end of the lectures.

Keywords: Power generation, fuel cell, DAFC.