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## Direct ethanol fuel cell performance using polybenzimidazole/graphene oxide nanosheets electrolyte membrane

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Direct ethanol fuel cells (DEFCs) have become a promising power generation technology due to the simple systems without the need of reformers. It is especially suitable for portable, mobile and transportation applications. Ethanol is an environmentally friendly fuel and possesses higher energy density than methanol (8.00 vs. 6.09 kWh kg<sup>-1</sup>). Ethanol can be easily produced in large quantities from biological processing of agriculture products and it is considered a renewable energy source. In this presentation, the developments of membrane electrolyte and electro-catalyst are presented. The design principle and the structure-property relationship between materials and cell performance are discussed. The best results from the author's group are 184 mW/cm<sup>2</sup> using Pt-based catalysts and 100 mW/cm<sup>2</sup> using non-Pt catalysts, along with polybenzimidazole/graphene oxide composites. These values are significantly higher than literature data.

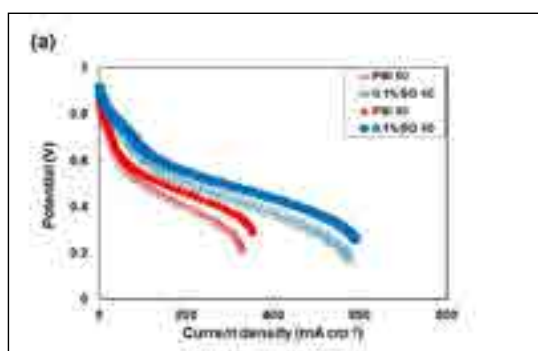


Figure-1: Polarization curves of alkaline direct ethanol fuel cells using PBI and PBI/GO membrane electrolytes at 60-80°C.

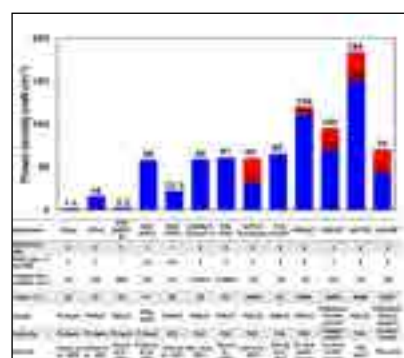


Figure-2: Comparison of peak power densities of direct ethanol fuel cells reported in literature and this work. The last two columns are data achieved using Pt- and non Pt-based catalysts, respectively.

### Biography

Shingjiang Jessie Lue has obtained her BS and MS degrees from National Taiwan University, Taiwan and PhD degree of Biotechnology Engineering from University of Missouri-Columbia, USA in 1990. Her research interest focuses on the development of high-performance materials for separation, energy and biotechnology applications. She has published nearly 80 SCI papers and 2 book chapters, given 140 conference presentations and applied 2 patents.

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