**Low-Volatile Ionic Liquid and Gel Electrolytes for Highly Stable and Efficient Dye-Sensitized Solar Cells**

by Neo Chin Yong

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**Abstract**

Dye-sensitized solar cells (DSCs) are promising to replace silicon solar cells because of their low fabrication cost and decent power conversion efficiency. However, the poor photovoltaic stability of these devices has hindered the commercialization of DSCs. This thesis reports the use of low-volatile ionic liquid and gel electrolytes to replace the high-volatile organic solvents, to improve the long-term device stability. Acid-functionalized multiwall carbon nanotubes (oMWCNTs) were used to reduce the viscosity of an ionic liquid, to improve the device performance. In addition, graphene oxide (GO) and a synergistic mix of oMWCNTs and ethyl cellulose were used as the gelators for the quasi-solid state electrolytes, in the fabrication of highly stable and efficient DSCs. Lastly, multiwall carbon nanotubes (MWCNTs) were used as extended electron transfer materials (EETMs) in the GO-3-methoxyproponitrile (MPN) gel electrolyte to enhance the device performance.

**Speaker** Neo Chin Yong

Mr Neo Chin Yong obtained his bachelor’s degree in Materials Science and Engineering from the National University of Singapore (NUS) in July 2009. He is currently a graduate student, under the supervision of Assoc. Prof. Ouyang Jianyong, in the Department of Materials Science and Engineering (DMSE), NUS. His research focuses on the investigation of ionic liquid and gel electrolytes for highly stable and efficient dye-sensitized solar cells.