Abstract

Due to the intrinsic problems with the conventional iodide/triiodide redox couple, various redox mediators have been evaluated and characterized in dye-sensitized solar cells (DSCs). The mediators studied can be separated into two categories: organic sulfur and cobalt bipyridyl complexes. These mediators, and DSCs based on these mediators, were characterized with a range of (photo-)electrochemical techniques, including cyclic voltammetry, current-voltage characteristics, incident photon-to-current efficiency, transient absorption, and impedance spectroscopy. In the course of these studies, fundamental insights were gained into the operating principles of DSCs employing these redox mediators, and a new method was developed to confirm the magnitude of the electron diffusion length when it is shorter than the TiO2 film thickness. Finally, the performance of DSCs using these redox mediators was improved.

Biography

Ms Liu Yeru obtained her M.Eng. in Materials Physics and Chemistry from the University of Science and Technology of China in July 2009. She is currently pursuing her Ph.D degree under the supervision of Asst. Prof. Wang Qing, in the Department of Materials Science and Engineering, National University of Singapore. Her research focuses on alternative redox mediators for efficient dye-sensitized solar cells.