Molecular Engineering of Organic Photosensitizers for High Efficiency Dye-sensitized Solar Cells

by Ms. Fan Li

Date: 8th November 2013, Friday
Time: 12:00 to 1:00 pm
Venue: E3-06-08

Abstract

Dye-sensitized solar cells (DSCs) have received much attention in the past decades mainly due to potentially low-cost fabrication, possibility of transparency, color selectivity and many other advantages. Among various kinds of photosensitizers, organic dyes are especially promising as the versatile molecular structure, high extinction coefficient and lower cost. Up to now, the performance of DSCs based on D-π-A organic dyes has been remarkably improved in conjunction with cobalt-based electrolyte and a record PCE more than 12% has been achieved. Recently, the introduction of additional acceptor chromophores between the donor and the π-bridge which leads to a D-A-π-A architecture becomes a useful method to facilitate intramolecular charge transfer and adjust the bandgap energy for harvesting more NIR light. Here for the first time we introduce benzothiazole-cyclopentadithiophene (BT) moiety as spacer to develop a novel D-A-π-A photosensitizer named CBTDTC with much extended long wavelength light absorption. The photophysical, electrochemical and photovoltaic performances of the D-A-π-A dye are investigated in detail with different characteristic methods. After optimization, a high efficiency of 9% has been achieved by our new dye. In addition, charge recombination and charge transport, effect of the co-adsorbent on device performance both in iodide and cobalt electrolyte systems have also been studied.

Speaker Ms. Fan Li

FAN LI received her Bachelor degree in Materials Science and Engineering from Nanjing University of Science and Technology in 2012. She is currently a PhD candidate under supervision of Assistant Professor Wang Qing. Her research is focused on dye-sensitized solar cell.