*RCMS & Global COE Seminar*

# New Dyes for Dye-Sensitised Solar Cells


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B-212 (化学科第 2 講義室)


Dye-sensitised solar cells (DSSC) offer the possibility of low-cost photovoltaics using a light-harvesting dye bound to $TiO_2$. Ru-complex dyes have been widely studied due to their favourable excited-state characteristics. We have studied a series of dyes of structure [Ru(4,4′-{$CO_2H$}bipy)2(dithiolene)] where the acid-substituted bipy ligands bind the dye to $TiO_2$ and the dithiolene ligand is used to modify the electronic properties. The dyes have been characterised by electrochemical, spectroscopic (UV/Vis, emission), spectroelectrochemical (UV/Vis/NIR, in situ EPR), structural and computational (DFT, TDDFT) methods to fully understand the electronic properties of the dye molecules. We have also carried out tests in DSSC through measurement of I-V data under illumination, incident-photon-to-current conversion efficiency (IPCE) and transient spectroscopy to determine kinetic parameters. These data will be discussed in terms of the target objectives to develop dyes with enhanced stability, light absorption characteristics and with enhanced charge separation.


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