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Synthesis and controllable time and feed ratio of organic-inorganic hybrids with near infrared absorption for solar cells

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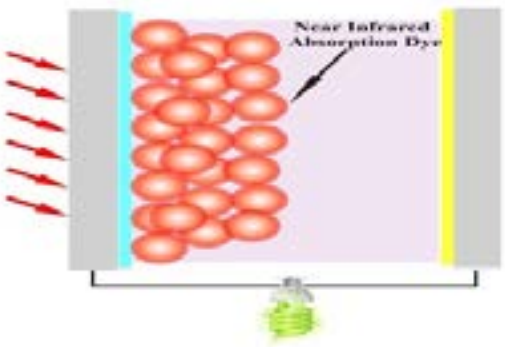
Nowadays organic dye materials are receiving more interest in solar cell due to improved solution process ability, scalable synthesis, tunable chemical and physical properties via molecular design and low cost. However, the compatibility and aggregation of squaraine dye limited broad application. In this study, we designed a system contend of octavinyl-polyhedral oligomeric silsesquioxane OV-POSS which used to solve these problems. These is the first time designed a novel hybrids large broad absorption visible to near infrared transient absorption spectroscopy, prepared by OV-POSS with 6-Bromoquanaldine and squaric acid (semisquaraine (SSQ) squaraine (SQ)) H2 their light properties a broad spectral coverage in a big region from 400 to 800 nm. Our systems were characterized by Fourier Transform Infrared Spectroscopy FTIR, 1HNMR, UV-Vis-Spectra, Water contact angle images and FE-SEM properties, and when a combination our system dyes with N719 as co-sensitization in photovoltaic performance using Ti foil-based solar cell DSSC. It showed highest properties a power conversion efficiency of 7.73%, with a short-circuit current density (Jsc) of 18.48 mA/cm^2 , an open-circuit voltage (Voc) of 0.73 V and a fill factor of 46.22% under the AM 1.5G illumination with an intensity of 100 mW/cm^2 from a solar simulator hence exhibited good performance in solar cell application.



Recent Publications:

1. Wang S, et al. (2015) Controllable preparation and properties of active functional hybrid materials with different chromophores. RSC Advances 5(2):1070-1078.
2. Puyad A L, et al. (2013) A comparative study of semi-squaraine and squaraine dyes using computational techniques: tuning the charge transfer/biradicaloid character by substitution. Journal of Molecular Modeling 19(1):275-287.
3. Yan Z, et al. (2012) Near-infrared absorbing squaraine dyes for solar cells: Relationship between architecture and performance. The Journal of Physical Chemistry C 116(16):8894-8900.

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