Characterization of solar cells using nano titanium oxide and nanocomposite materials

Dinh N.N., Quyen N.M., Chi L.H., Thuy T.T.C., Trung T.Q.

College of Technology, Vietnam National University Hanoi, 144Xuan Thuy, Cau Giay, Hanoi, Viet Nam; Thai Nguyen University of Education, 18 Luong Ngoc Quyen, Thai Nguyen City, Viet Nam; College of Natural Science, Vietnam National University, 227 Nguyen Van Cu Road, Ho Chi Minh City

Abstract: Dye-sensitized (DSSC) and organic composite solar cells (OCSC) were prepared for characterization and comparison of their photovoltaic conversion parameters like open-circuit voltage (Voc), short-circuit photocurrent (Jsc), energy photovoltaic conversion efficiency (PEC). Nanocrystalline $Ti0_2$ films sensitized hy the Ru(dchpy)(NCS) $_2$ dye (N3) were used for DSSCs and nano structured poly[2-methoxy-5-(2'-ethyl-hexyloxy)-l,4-phenylene vinylene] (MEHPPV) incorporating nc-$Ti0_2$ (MEH-PPV+nc-$Ti0_2$) composites were used for OCSCs. The influence of the addition of 4 - tert-hutylpyridine (4TBP) or acetic acid to the electrolyte was investigated. The polymer luminescence quenching effect of the nanocomposites was observed. Due to this, MEH-PPV+nc-$Ti0_2$ nanocomposites can be used for organic solar cells. The PEC of the OCSCs using a 300 nm-thick nanocomposite film was reached a value as high as 0.15% that is comparable to the PEC of the nc-$Ti0_2$ DSSC. ?? 2009 American Institute of Physics.

Author Keywords: Dye-sensitized solar cell (DSSC); Na nocomposites. current-voltage characteristic (I-V); Organic composite solar cells (OCSC)

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Correspondence Address: Dinh, N. N.; College of Technology, Vietnam National University Hanoi, 144Xuan Thuy, Cau Giay, Hanoi, Viet Nam

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Authors with affiliations:
1. Dinh, N.N., College of Technology, Vietnam National University Hanoi, 144Xuan Thuy, Cau Giay, Hanoi, Viet Nam
2. Quyen, N.M., College of Technology, Vietnam National University Hanoi, 144Xuan Thuy, Cau Giay, Hanoi, Viet Nam
3. Chi, L.H., College of Technology, Vietnam National University Hanoi, 144Xuan Thuy, Cau Giay, Hanoi, Viet Nam
4. Thuy, T.T.C., Thai Nguyen University of Education, 18 Luong Ngoc Quyen, Thai Nguyen City, Viet Nam
5. Trung, T.Q., College of Natural Science, Vietnam National University, 227 Nguyen Van Cu Road, Ho Chi Minh City
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