

9<sup>th</sup> World Congress on**MATERIALS SCIENCE AND ENGINEERING**

June 12-14, 2017 Rome, Italy

**Flexible synthesis of anatase TiO<sub>2</sub> nanocrystallines for dye-sensitized solar cells applied at regular sunlight and room light conditions****Yu-Ling Guo, Chao-Kun Hung and Yu-Chun Wu**  
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Microwave-assisted solvothermal process was used to synthesize anatase TiO<sub>2</sub> nanocrystallines for the application of dye-sensitized solar cells (DSSCs). The morphologies and sizes of TiO<sub>2</sub> could be simply controlled by using different kinds of alcohols where no additives were needed. By using isopropanol (IPA) as solvent, TiO<sub>2</sub> in size of 20-30 nm with dominant {001}/{010} facets was obtained; whereas ultrafine anatase TiO<sub>2</sub> of about 5 nm with dominant {101}-facet was obtained using octanol (OCT). To investigate the influences of TiO<sub>2</sub> on the photovoltaic performances of DSSCs, three different pastes were fabricated using IPA, OCT and mixed IPA/OCT as photoanodes. The results revealed that the requirements of TiO<sub>2</sub> photoanodes used at one sun and room light conditions were quite different. OCT showed the highest power conversion efficiency (PCE) up to 9.58% under one sun irradiation because of its high specific surface area that provided high dye-loading capacity. However, the great amount of grain boundaries appeared in OCT became disadvantageous at room light condition. On the other hand, IPA/OCT combined the features of IPA and OCT that was optimal for room light harvesting and its PCE reached 12.46% under 200 lux T5 lamp irradiation. The photovoltaic properties of three different photoanodes in correlation with their band structures, electronic transport behaviors and light harvesting efficiency in different lighting conditions will be carefully discussed in this presentation.

**Biography**

Yu-Ling Guo is pursuing her Master's degree from National Cheng Kung University, in Resource Engineering. She is doing research with a focus on dye-sensitized solar cells. She has also presented her work at the Annual Meeting of Taiwan Ceramic Society. In addition, she has conducted research on polymer and drug control release and has gained College Student Research Training Fellowship from the National Science Council.

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