

Microwave Sintering Technique for Size Scale-up of Dye-Sensitized Solar Cells

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Venue: Blk EA, #06-02, Faculty of Engineering, NUS
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Abstract:

A new type of solar cell based on dye-sensitized nanocrystalline titanium dioxide (DSSC) has been developed by M. Graetzel et al. Remarkably high quantum efficiency in combination with the expected ease and low cost of manufacturing makes this new technology interesting as an alternative to existent solar cell technologies. Various elemental technologies of dye-sensitized solar cells have therefore been researched, including the sensitized dye, semiconductor particles, electrolyte, electron transfer process and photovoltaic mechanism. In spite of these vigorous studies, the assembling of flexible TiO₂/dye solar cell is still under investigation. Flexible electrodes, like polyethylene terephthalate sheet coated with tin-doped indium oxide (PET-ITO), present lower costs and technological advantages relative to conductive glass electrodes, e.g. lower weight, impact resistance and less form and shape limitations. However, deposition of nano particulate TiO₂ on PET-ITO is difficult, because the thermal treatment must be limited to 150C⁰ or so. It decreases adhesion strength, electrical contact of TiO₂ particles and adsorption of the dye. Here in this work, a microwave irradiation process is proposed for selective heating the nanocrystalline titanium oxide films of DSSC.

Biography: <http://kuroppe.tagen.tohoku.ac.jp/~uchida/profile-e.html>

Affiliated Organization

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Academic Background

1988.3 B.Eng: Faculty of Engineering, Chemistry, Tohoku University
1995.2 Dr.Eng: Graduate School of Engineering, Applied Chemistry, Tohoku University
Thesis Title "Study of Ni, Cu, Zn, Sn Leaching from Metal Scrap by Hot Aqueous Solution"

Research and Business Career

1991.4	Research Institute of Mineral Dressing and Metallurgy (SENKEN), Tohoku University	Research Associate	Extraction and Leaching of Metals from Ore by Hydrothermal Process
1994.4	Institute for Advanced Materials Processing (IAMP), Tohoku University	Research Associate	Hydrothermal Synthesis of Various Metal Oxides
1996.4	Institute for Chemical Reaction Science (ICRS), Tohoku University	Research Associate	Hydrothermal Synthesis of TiO ₂ and their Photochemistry
2001.4	Institute of Multidisciplinary Research for Advanced Materials (IMRAM), Tohoku University	Research Associate	Synthesis of Nano Crystalline TiO ₂ and their Application for Dye-Sensitized Solar Cells

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