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Development of paint-type dye-sensitized solar cell using carbon-nanotube- paint and evaluation of its painted electrodes for efficient power generation

Yuki Matsunaga, Takahide Oya
Yokohama National University, Japan

We propose “paint-type” Dye-Sensitized Solar Cells (DSCs) using Carbon-Nanotube (CNT) paints. Recently, solar power generation has been focused because of current environmental problems. The DSC that is one of solar cells consists of semiconducting and metallic electrodes facing each other. The semiconducting electrode is attached dye. When an electrolyte is placed between two electrodes and the cell is irradiated by light, it starts power generation. In this study, we develop and use semiconducting- and metallic-CNT paints for electrodes of our DSC. The semiconducting-paint contains the dye. Therefore, we can obtain the paint-type DSCs by only painting any objects. As a first study, we used ordinary papers as substrates to paint the CNT paints for two electrodes and found our DSC had power generating ability. However, its efficiency of power generation was not so high. We are now studying to improve the efficiency by controlling parameters of paints, electrolytes, and kinds of dyes. We here focus on conductivity of the paint on substrates because it influences the efficiency directly. We prepared some painted electrodes that had different conductivity and evaluated their properties. As results, we found that controlling conductivity must be needed to obtain high efficiency of power generation, i.e., we must control the concentrations of the CNT and other contents in the paints. In near future, we will study and find suitable parameters of electrolytes and the dyes. Finally, we will develop the high efficient paint-type DSC, we believe.

Biography

Yuki Matsunaga was received the B.E. degree from Yokohama National University, Kanagawa, Japan in 2014. He is now 2nd year of a master course student of Graduate School of Engineering, Yokohama National University. His current research interests include development of unique applications using carbon nanotubes (CNTs), i.e., of paint-type DSC using CNT-paints.

matsunaga-yuki-wc@ynu.jp

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