

Study on electrochemical property of annealed carbon nanotube as counter electrode

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In order to enhance electrochemical properties of CNT electrode, we have studied the effect of annealed carbon nanotubes (CNTs) for the counter electrode of DSSCs. CNTs on the p-type Si substrate were synthesized by chemical vapor deposition (CVD) using Fe catalysts. The growth temperature was 900 °C. The rapid thermal annealing (RTA) treatments on the CNTs were carried out at the growth temperature (900 °C) for 1 minute with N₂ gas atmosphere. We separated the CNTs from Si substrate by dispersion method. We prepared CNT paste using mixed solution with thermal annealed CNTs, Carboxyl Methyl Cellulose (CMC) and De Ionized Water (DIW). The structural and electrochemical properties of CNTs were investigated by field-emission scanning electron microscopy (FE-SEM), Raman spectroscopy, and electrochemical impedance spectroscopy (EIS). In this study, it was found that the I(D)/I(G) ratio of annealed CNTs was considerably decreased. And EIS measured that, the reaction time of the frequency of annealed CNTs was faster than that of unannealed CNTs and the total resistivity of the annealed electrode had much lower than that of unannealed electrode at the interface.