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Abstract
In order to search for an efficient and a low cost counter electrode in a dye-sensitized solar cell, carbon nanoclusters and carbon nanotubes grown onto glass and ITO substrates were conducted to explore the performance of the counter electrode in a dye-sensitized solar cell．The effects of the morphology, average roughness and charge-transfer resistance of nano-carbon material counter electrode on the performance of a dye-sensitized solar cell were investigated．
The carbon nanoclusters counter electrode was grown by electron cyclotron resonance chemical vapor deposition (ECR-CVD) method and its' characteristics were analyzed．The experimental parameters include catalyst， substrate， temperature and pressure．The surface morphology and structure of nano-carbon materials were examined by scanning electron microscope (SEM) and transmission electron microscope (TEM)．The sheet resistance was examined by four-point probe．The roughness factor was examined by atomic force microscopy (AFM)．The charge-transfer resistance will be examined by autolab potentiostat．The result shows that carbon nanocluster counter electrodes grown at low deposition temperature have a large average surface roughness, and a good chemical stability to I3-/I- couple. A low charge transfer impedance (RCT) of approximately 5.51Ωcm2 can be obtained for an electrode area of 1.82cm2.
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