

Effects of 2D graphene sheet and 3-dimensional crumpled graphene on the characteristics of dye-sensitized solar cells

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Since they were developed by the Grätzel group, dye-sensitized solar cells (DSSCs) have received interest for their high power conversion efficiency (PCE) and low fabrication costs. One of the key considerations for preparing high performance DSSCs is to transport photoelectrons generated from the dye molecules to the collecting electrode while competing the charge recombination. Therefore, much attention has been paid to this area in extensive research to improve PCE by surface modification of photo- and counter-electrodes that has been carried out. Recently, the researches for the incorporation of graphene into various electrodes in DSSCs have begun to improve the performance of DSSC.

In this study, DSSCs using the modified electrodes with 2D and 3D graphene will be introduced. The photovoltaic characteristics of 3D crumpled graphene/2D graphene sheet/TiO₂ photoanodes for DSSCs are investigated and the effect of graphene sheets deposition on FTO glass is discussed.