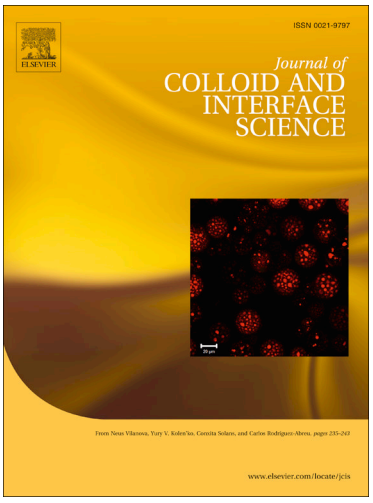

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In-situ synthesis of Molybdenum Sulfide/Reduced Graphene Oxide porous film as robust counter electrode for dye-sensitized solar cells

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Abstract

Molybdenum sulfide/reduced graphene oxide (MoS_2/RGO) porous film was in-situ deposited on fluorine-doped tin oxide (FTO) substrates via a one-pot hydrothermal method. Due to the oxygen-containing groups distributing on graphene oxide (GO) surface, the MoS_2 sheets could nucleate and grow taking GO as substrates and the MoS_2/RGO film can be strongly linked to the FTO. Based on the electrochemical investigations, the enhanced cell performance could be ascribed to the improved electrical conductivity, catalytic active sites and electrolyte diffusion rate, which finally contribute to the high catalytic performance on the reduction of I^-/I_3^- couples in the electrolyte. Therefore, the cell adopting as-prepared MoS_2/RGO as counter electrode demonstrated high power conversion efficiencies (PCE) of 7.63 %, which indicates ~14 % enhancement compared with the MoS_2-based (6.68 %) device.

Keywords: Nanomaterials; MoS_2; Graphene; Counter electrode; Dye-sensitized solar cells