Characterization and photocatalytic activity evaluation of visible light active CdS-TiO_2/SAC

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CdS-TiO_2 supported on spherical activated carbon (CdS-TiO_2/SAC) with adsorption capacity and visible light active was prepared by ion-exchange method and heat-treatment process. The characterization of the prepared CdS-TiO_2/SAC was carried out through SEM, TEM, XRD, XPS, EDS, and BET. The results obtained showed that CdS-TiO_2/SAC has a smooth spherical shape with its diameter ranging from 0.31 to 0.57 mm. CdS-TiO_2 (7-8 nm in size) was well dispersed on the surface of spherical activated carbon. The photocatalytic activity of TiO_2/SAC, CdS-TiO_2/SAC, CdS/SAC was evaluated by degradation of methyl orange (MO) under full or visible light wavelength irradiation. Under visible light irradiation ($\lambda > 420$ nm), TiO_2/SAC and CdS/SAC did not exhibit photocatalytic activity, while CdS-TiO_2/SAC exhibited high photocatalytic activity.