

Efficient photocatalytic activity of MnO₂-loaded ZrO₂/carbon cluster nanocomposite materials under visible light irradiation

ABSTRACT

Nano-sized ZrO₂/carbon cluster nanocomposite material was successfully prepared by the calcination of Zr(acac)₄/epoxy resin complex in air. The composite material obtained by calcining at 200 °C was treated with hydrogen hexachloroplatinate hexahydrate (H₂PtCl₆) to obtain Pt-loaded materials denoted as Ic200Pt'sH's. The Pt-loaded material modified with MnO₂ particles efficiently decompose water into H₂ and O₂ with a [H₂]/[O₂] ratio of 2 under the irradiation of visible light ($\lambda > 460$ nm) through the electron transfer process of MnO₂ → carbon clusters → ZrO₂ → Pt.

Keyword: Carbon; Polymer; Nanostructure; Characterization