Visible light induced photocatalytic activity of Nb2O5/carbon cluster/Cr2O3 composite materials

ABSTRACT

Nano-sized Nb2O5/carbon cluster/Cr2O3 composite material was prepared by the calcination of NbCl5/chromium acetylacetonate/epoxy resin complex under an argon atmosphere. The Pt-loaded Nb2O5/carbon cluster/Cr2O3 composite material shows the photocatalytic activity under visible light irradiation. The composite material successfully decomposed the water into H2 and O2 in the [H2]/[O2] ratio of 2. Electron spin resonance spectral examination suggests a two-step electron transfer in the process of Nb2O5 → carbon cluster → Cr2O3 → Pt.

Keyword: Nanostructure; Carbon cluster; Semiconductor; Chemical synthesis; Electronic structure