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A novel Ce(IO₃)₄ catalyst: Facile preparation and high activity in degradation of organic dyes without light irradiation at room temperature

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ABSTRACT

Developing efficient catalysts capable of degrading organic dye free of light irradiation is highly interesting from the energy-saving point of view. In this work, we prepared a new Ce(IO₃)₄ catalyst by a facile precipitation method. The obtained Ce(IO₃)₄ sample showed remarkably superior performance to the reported CeGeO₄ analogue in degradation of rhodamine B (RhB), methyl orange (MO) or methylene blue (MB) dyes in the dark at room temperature. The ultraviolet-visible (UV-vis) absorption spectra of dye solution during degradation, the XPS results of Ce(IO₃)₄ and the control experiments confirmed that the dye degradation is a catalytic process. The reusability of it was also investigated in the degradation experiments.

Key words: Inorganic compounds; Chemical synthesis; Amorphous materials; Photoelectron spectroscopy.

1. Introduction

The large scale of textile industry, which released much organic dyes that are not degradable naturally, constitutes a major source of water pollution. Photocatalysis technology has been increasingly important because of its application in degradation of organic dye pollutants with sustainable solar energy [1-8]. The core issue of utilizing solar energy through photocatalysis is to develop visible-light-responsive photocatalysts to fully use visible light, which is the most abundant in solar radiation, during photocatalytic process [5, 9]. However, it is still difficult to obtain visible-light-responsive photocatalysts with high performance for dye pollutants

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