

## Visible light induced electron transfer behavior of a CeO<sub>2</sub>-loaded HfO<sub>2</sub>/carbon cluster nanocomposite material

### ABSTRACT

The microwave-irradiated calcination of HfOCl<sub>2</sub>/starch complex I under an air atmosphere produced the HfO<sub>2</sub>/carbon cluster composite material which is denoted as Ic. The obtained composite material could decompose methylene blue under the irradiation of light ( $\lambda > 460$  nm). The surface of Ic was loaded with CeO<sub>2</sub> particles to obtain CeO<sub>2</sub>-loaded composite material, which can decompose the aqueous silver nitrate solution and produce O<sub>2</sub> and Ag in the ratio of 1:4.2. Water photo-decomposition experiment was also carried out using Pt-modified composite materials.

**Keyword:** Semiconductors; Polymers; Nanostructures; Inorganic compounds; Electronic structure