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Photocatalytic heterojunction of $CeCoO_3$/CdS for conversion of organic dyes

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Recently, oxide perovskites with the general formula ABO3 have attracted the attention of many scientists [1]. Cerium cobalt oxide perovskite, represented by CeCoO3, exhibits promising capabilities as a nanophotocatalyst in the conversion of organic dyes [1]. Additionally, Cobalt(II) sulfide (CdS), a semiconductor, shows high performance in light absorption due to its suitable band gap energy [2,3]. The CeCoO3/CdS photocatalysis was synthesized using the hydrothermal method. The prepared heterojunction structure was characterized using various techniques and applied to the decolorization of methylene blue under visible light irradiation. FT-IR, FE-SEM, EDS, PL, and DRS analyses were employed to identify the properties of CeCoO3/CdS photocatalysis. The FE-SEM images demonstrated the successful deposition of CdS on the surface of CeCoO3 perovskite. The effect of catalyst amount, temperature, pH, and electron acceptor was investigated. In the presence of the CeCoO3/CdS photocatalyst, the decolorization rate of methylene blue reached 99% within 15 minutes, whereas no significant conversion of methylene blue was observed with the perovskite alone. The higher photoactivity of CeCoO3/CdS is attributed to its lower charge recombination compared to pure perovskite. Additionally, the photocatalytic mechanism and recycling tests of CeCoO3/CdS are discussed in detail.

Keywords: Conversion of Dyes,Perovskite,Photocatalyst

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