

Environmental chemistry 2020 -About photo catalytic metal complexes for Cr(VI) to Cr(III) reduction reaction- Takkashiro Akitsu- Tokyo University of Science

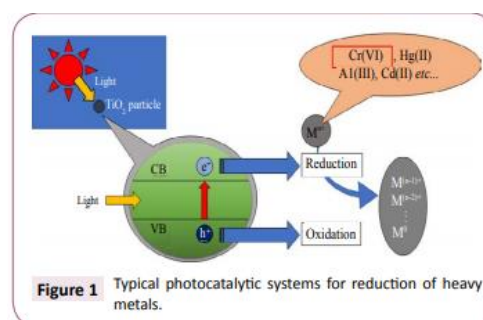
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Abstract

Many industries sometimes emit harmful products for the environment. Hexavalent chromium is regulated, but there are uses that cannot be substituted, mainly used for plating, leather product processing, cement hardening materials and so on. There is also still report of soil contamination of Cr (VI) in Japan all over the country. Thus, the toxicity of chromium compounds predominantly depends on oxidation states of chromium ions, and well-found and stabilized states are Cr (VI) and Cr (III). Solubility and toxicity of Cr (VI) compounds are higher than that of Cr (III) and the latter is usually readily immobilized by precipitation. Thus, reduction of Cr (VI) in the highest valence to Cr (III) has been widely employed as an efficient approach to reduce chromium contamination in the environment (Figure 1). Exposure to various forms of Cr (VI) containing compounds has been consistently found to be associated with an elevated incidence of respiratory cancers and other adverse health damage for human beings.

Role of valence state and solubility of chromium compounds on induction of cytotoxicity is also important in this context. Importance of chromium-DNA adducts in mutagenicity and toxicity of Cr (VI) was also noticed significantly.

- Photocatalytic activity of Cu(II) complexes and their TiO₂ hybrid systems was examined
- Photocatalytic activity of Cu(II) complexes based on amino acid Schiff bases was in the order: CuAHN > CuVHN > CuFHN.
- For CuAHN hybrid and sole complex, the most effective photocatalytic activity was observed in the region 460–495 nm.
- The GGA (BP86) and hybrid (B3LYP) functionals can be used for calculations of redox potentials.



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