Retrieval of Mercury from Wastewater as Stable Mercury Ferrite
Water Quality Research Journal of Canada

Mercury contamination in water and wastewater is a global risk and health problem. So there is a concrete need for an eco-friendly process that can remove the toxic mercury ions as well as convert the mercury to a value added product. The black ferruginous mercury ferrite (FMF) as a value added product was synthesized by coprecipitation technique at 50°C. X-ray diffraction studies conducted on FMF obtained using $CuK_{\alpha 1}$ radiation revealed that this crystalline compound has an orthorhombic symmetry. The method described in this study removed mercury ions with greater efficiency compared with the prevalent methods quoted in the literature. The results of thermal analysis of the synthesized compound, on comparison with magnetite (Fe_3O_4), revealed a shifting of the exothermic peak towards the lower temperature side. This behavior indicates phase transition and sample crystallization. The DC resistivity studies on FMF carried out at various temperatures in the range of 27 to 500°C showed that the compound is a semiconductor in nature and shows sharp changes in the resistivity in the temperature range of 342.38 ± 10°C (Tc_{elect}). The recovered FMF could be used in several applications such as semiconductors, at high temperature applications, to minimize eddy current losses, and as adsorbents as well as catalysts for the reduction of exhaust gas emissions.