



Potential Application of A Novel Bimetallic Cation Exchanger For The Catalytic Degradation of Malachite Green From Aqueous Solution

M.A. Dhanitha¹, S. Siji² and C. Janardanan^{3*}

*Post Graduate and Research Department of Chemistry, Sree Narayana College, Kannur, Kerala 670007, **INDIA**

Email: ghanithabiju@gmail.com

Accepted on 17th February 2015

ABSTRACT

The present investigation focused on the degradation ability of a novel inorganic cation exchanger Zirconium cerium molybdate (ZCM) against malachite green dye in aqueous solution. This exchanger was characterized by some physicochemical properties like FTIR, XRD, TGA-DTA, SEM and ion exchange properties to validate the structure and ion exchange behavior. The exchanger shows high ion exchange capacity of 1.64 meqg^{-1} as well as good chemical and thermal stability. The pH titration studies revealed mono functional behavior of the exchanger. The distribution studies of various metal ions showed that the material was highly selective for Pb^{2+} and Mn^{2+} ions. In order to explore the environmental applicability of the newly synthesized ion exchanger, its degradation potential towards malachite green dye was studied. The batch experiments were carried out by the treatment of aqueous dye solution with the exchanger. About 88% of the dye was degraded within 6 hours contact with the exchanger. The effect of process parameters viz. reaction time, pH, temperature, initial dye concentration and the amount of catalyst on degradation of dye has also been assessed with the help of UV-Visible Diffuse Reflectance Spectrophotometer. The entire studies revealed that ZCM was an effective catalyst for the removal of malachite green, which showed the applicability of material towards environmental remediation.

Keywords: Malachite green, dye degradation, distribution studies, batch experiments etc.
