

**Lebea N. Nthunya^{1,2*}, Monaheng L. Masheane^{1,2}, Mosotho George¹,
Méschac-Bill Kime³, Sabelo D. Mhlanga⁴**

REMOVAL OF Fe AND Mn FROM POLLUTED WATER SOURCES IN LESOTHO USING MODIFIED CLAYS

¹Department of Chemistry and Chemical Technology, National University of
Lesotho, Maseru;

²Department of Applied Chemistry, University of Johannesburg,
South Africa;

³Department of Metallurgy, University of Johannesburg, South Africa;

⁴Nanotechnology and Water Sustainability Research Unit, University of
South Africa, Johannesburg

*nthunyalebea@gmail.com

This paper reports the use of unfunctionalized and phenylalanine functionalized clays as an alternative cost effective, environmental friendly and efficient sorbent for the removal of Mn and Fe from polluted drinking water sources in Lesotho. The Mn and Fe metals were adsorbed on two different clays (clay A – a black clay and clay B – a yellow clay) collected from Ha-Teko in Maseru (clay A) and Phogoane in Mafeteng district (clay B). Comprehensive batch test studies were performed to assess the effect of pH, stirring time and initial concentration of Mn and Fe. The adsorption of the metals was greater at higher pH and equilibrium was reached at pH 8 after 30 min of stirring. The phenylalanine functionalized clays displayed improved adsorption efficiency of up to 100 % (Fe adsorption using clay A in 30 min) while the unfunctionalized clays gave relatively low adsorption of up to 70 % (Fe and Mn adsorption using clay A). The clays, which are present in abundance in Lesotho, can be effectively used for the removal of Fe and Mn from drinking water sources.

Keywords: adsorption, clay, phenylalanine, water purification, manganese, iron.

Introduction

Sewage discharges, urban runoffs, agricultural wastes, industrial effluents and open pit latrines located nearby water sources are known to introduce a lot of harmful pollutants into water sources [1, 2]. This presents a real threat as toxic metals may also be entrained to water treatment systems. The presence of high concentrations of Fe and Mn ions in water sources in Lesotho is a growing

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