

International Conference on

Industrial Chemistry

June 27-28, 2016 New Orleans, Louisiana, USA

Adsorptive removal of excess fluoride in drinking water using silica rich reddish black clay soils: Adsorbent preparation, performance and study of adsorption mechanisms

Tholiso Ngulube

University of Venda, South Africa

Excess fluoride is highly toxic to humans and has serious detrimental health problems. The purpose of this study was to evaluate the feasible application of silica rich reddish black Mukondeni clay soils as a convenient and cheap technology for the removal of excess fluoride from ground water. Characterisation was done by XRF, XRD, SEM, BET and FTIR. CEC and PZC were determined using standard methods. Parameters optimized included: contact time, adsorbent dosage, initial concentration, competing ions, pH and temperature. Optimisation experiments were done in batch procedures. The results showed that the optimum conditions for the defluoridation of water using silica rich reddish black Mukondeni clay soils are 60 min, 1.5 g, 9 mg/L, 1.5/100 S/L ratios a pH of 2 and a temperature of 25°C. The equilibrium isotherm regression parameter (R^2) showed that the Freundlich isotherm (0.95) gave a better fit than the Langmuir isotherm (0.52), and the Dubinin-Radushkevich isotherm (0.78) which indicates multilayer adsorption. The value of the Activation energy of (58.8554 kJ/mol) obtained from the Arrhenius Equation indicates chemisorption. Kinetic studies revealed that the adsorption followed pseudo second order kinetics. This study indicated that silica rich reddish black Mukondeni clay soils are good in defluoridation of groundwater.

Biography

Tholiso Ngulube has just completed her MSc degree in Environmental Sciences and is currently registered for PhD at the University of Venda. She is a member of the Environmental Remediation Water Chemistry and Pollution Group. She has also published 3 articles in international peer reviewed journals and has also attended 4 international conferences related to environmental sciences. She has been serving as a core Lecturer at Applied Centre for Climate and Earth Science Systems (ACCESS) and is also a tutor and mentor at the University of Venda.

tholisongulube@gmail.com

Notes: