World Academy of Science, Engineering and Technology
International Journal of Aerospace and Mechanical Engineering
Vol:9, No:11, 2015

Effect of Temperature on Adsorption of Nano Ca-DTPMP Scale Inhibitor

Authors : Radhiyatul Hikmah Binti Abu, Zukhairi Bin Md Rahim, Siti Ujila Binti Masuri, Nur Ismarrubie Binti Zahari, Mohd Zobir Hussein

Abstract : This paper describes the synthesis of Calcium Diethylenetriamine-penta (Ca-DTPMP) Scale Inhibitor (SI) and the effect of temperature on its adsorption onto the mineral surfaces. Nanosized particles of Ca-DTPMP SI were synthesized and TEM result shows that the sizes of the synthesized particles are ranged from 10 nm to 30 nm. This synthesized nano SI was then used in static adsorption/precipitation test with various temperatures (37°C, 60°C and 100°C) to determine the effect of temperature on its adsorption ability. The performance of the SI was measured by their diffusion capability, which can be inferred by weighing the metal-SI that successfully adsorbed onto the kaolinite (mineral) surface. The kaolinite samples were analyzed using Scanning Electron Microscope (SEM) and the results show the reduction of pores on kaolinite surface as temperature increases. This indicates higher adsorption of the SI particles onto the mineral surface. Furthermore, EDX analysis shows the presence of Phosphorus (P) and Magnesium (Mg2+) on kaolinite particle surface, hence reaffirming the fact that adsorption took place on the kaolinite surface.

Keywords : adsorption, diffusivity, scale, scale inhibitor
Conference Title : ICAMAME 2015 : International Conference on Aerospace, Mechanical, Automotive and Materials Engineering
Conference Location : London, United Kingdom
Conference Dates : November 27-28, 2015