

Enhancing electrokinetic environment to improve physicochemical properties of kaolinite using polyvinyl alcohol and cement stabilizers

ABSTRACT

Adsorption of polymers on clay and flocculation of clay by polymers in presence of cement were studied in order to understand clay polymer interactions. Also, findings into the stabilization effect of the kaolinite that was mixed with various binders to form a stabilized soil are presented. Special attention was focused on two types of PVA: fully (PVA-F) and partially (PVA-P) hydrolyzed with varying degrees of concentration. Although, increasing polymer concentration in both PVA-F and PVA-P samples enhanced physicochemical results, PVA-F showed higher improvement than PVA-P. As a result, Unconfined compressive strength (UCS) of stabilized kaolinite increased as high as 5 to 109 times comparing with untreated kaolinite. According to 28 days curing time, the optimum dose of PVA was also evaluated 3gr/L and 1gr/L for PVA-P and PVA-F, respectively. Although, pH at isoelectric point was between 3.1 and 3.2, isoelectric point of kaolinite immersed in PVA solution observed at pH between 1.9 and 2.1.

Keyword: Zetapotential; Clay; Polyvinyl alcohol; Electrokinetic; Soil improvement; Cement