Abstract No: (for official use only) ***Earth and Environmental Sciences***

FABRICATION OF NEW FLOW CELL FOR SURFACE TITRATIONS OF HETEROGENEOUS SOLID SUBSTRATES

P.Rukshagini[1,2*], B.A.Y.B. Jayawardhana[2], I.P.L.Jayarathne[2], S.K.Weragoda[1], R.Weerasooriya[2]

[1]Water Safety Plan Advisory Unit, National Water Supply and Drainage Board, Katugastota, Sri Lanka
[2]National Institute of Fundamental Studies, Kandy, Sri Lanka

Surface titration method is a mainstay technique in Environmental and Materials Characterization Laboratories to probe sites' reactivities of solids. Batch experimental methods are conventionally used to obtain surface titration data. It needs homogeneous suspension. However these environmental particulates are heterogeneous; some materials tend to settle in solution due to density variations which result erratic or non-reprduciable data. To circumvent this difficulty, a new flow cell particularly suited for rapid surface titrations of heterogeneous particulates that are porous was invented. Particulate materials were stored in the cell (Glass cell with porous material) a solution of desired pH was continuously pumped through the cell and was monitored for differet pH-statted conditions. The ion activities of the interface were calculated according to Boltzmann equation. The heterogeneous aquifer is composed of quartz 38.56 %, albiet 16.73 %, orthoclase, 8.1%, ankerite, 1.51 %, and muscovite, 2.84%. In flow cell surface titration curve shows a minimal noise in experimental data. The pH_{zpc} which resulted due aforementioned mineral surfaces is 5.5. Conventional batch technique, data shown in the latter case contains inherent noise largely due to inhomogeneous dispersion of particulates which results non-reproducible data. The data generated by flow cell method are consistent and reproducible. This data is vital in water treatment, fate assessment of sub-surface pollutants, heterogeneous catalysis and soil fertility and weathering.

Financial assistance from National Research Council (*Grant No TO 16-015*) *is acknowledged.*

Keywords: Surface titration, Aquifer, pH_{zpc}, Flow cell