SECTION E2

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Effect of temperature on Cu (II) – feldspar interaction

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Aqueous feldspar suspensions show a great affinity towards Cu(II) ions at low concentration levels. The partitioning of aqueous solutions of Cu(II) ions with feldspar suspensions leads to a significant removal of Cu(II) ions from aqueous solution. According to atomic absorption measurements, the percent removal of Cu(II) from 5.00 ppm standard $CuSO_4$ solution when treated with 5.000 g of powdered feldspar with diameter of less than 1.18 mm is increased from 76.4 to 95.5 when the temperature of the Cu(II)-feldspar system is increased from 293 K to 323 K. Consequently, the apparent partition coefficient, K_D, values of interaction of Cu(II) with feldspar increases with temperature indicating endothermic behavior for the transfer of Cu(II) ions from the aqueous phase to the solid feldspar phase. The standard Gibbs free energy change (ΔG°) of this transfer process, as calculated with the aid of standard thermodynamic relationships, varies from -8.48 kJ mol^{-1} to -14.4 kJ mol^{-1} within the temperature range of 293 K and 323 K. Further, the K_D values obtained at different temperatures fit the linear from of the van't Hoff equation, with a high regression coefficient of 0.993, resulting in an average standard enthalpy change (ΔH°) of 52.7 kJ mol^{-1} over the above temperature range.

Acknowledgement: National Science Foundation (grant number RG/2004/E/04)

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