

Quantitative Studies of Cadmium Ion (Cd^{2+}) Adsorption on Oxidized Graphite Powder

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Abstract

The adsorption behaviour of cadmium ions ($\text{Cd}(\text{II})$) on surfaces of oxidized graphite was investigated as a function of concentration of $\text{Cd}(\text{II})$ ions, contact time, and the amount of oxidized carbon used. Square wave anodic stripping voltammetry (SWASV) was used to measure the uptake of $\text{Cd}(\text{II})$ ions by oxidized graphite powder. Standard addition method was used to determine the amount of cadmium ion concentration. The adsorption of the metal ion specie on oxidized graphite was characterized by X-Ray Photo electron spectroscopy. Increase in atomic percentage of oxygen and decrease in atomic percentage of carbon after oxidation of graphite powder shows the successful oxidation of graphite with acid mixture of concentrated nitric and sulphuric acid. Adsorption capacity of bare graphite was found to be 37.37 %, where as that of oxidised graphite was 67.6 % when 10.0 ml of 100 μM cadmium ion solution was used with 100 mg of both sample. Also it was found that 300 mg of oxidized graphite powder adsorbed 92 % Cd^{2+} ions from 10 ml of 100 μM cadmium ion solution in 6 hours contact time. These results reveal that oxidized graphite has good adsorption capacity for adsorption of the cadmium ions.