EFFECT OF pH ON THE CO-PRECIPITATION OF HUMIC ACID AND SILICA FROM LEONARDITE AND THEIR ELECTRICAL PROPERTIES

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Abstract

Leonardite is composed of organic substance such as humic acid, fulvic acid and humin, as well as inorganic components such as silica, alumina and iron oxide. Humic acid was extracted by base and precipitated by adjusting the pH to 1-2 using acid. It formed a black precipitate. With increasing precipitation pH, the white precipitate identified as silica was observed. The effect of pH on the co-precipitation of humic acid and silica from leonardite and their electrical properties were studied. Humic acid from leonardite was extracted using 2 M of sodium hydroxide and precipitated by adjusting pH with sulfuric acid. The carbon content was analyzed by CHNS analyzer. The content and phase of silica were analyzed by X-ray fluorescence and X-ray diffraction, respectively. Electrochemical analysis showed the co-precipitation of humic acid and silica at pH 1 provided the highest specific capacitance of 192.37 F g^{-1} at a scan rate of 10 mV s^{-1}, using a composition ratio of carbon:PVDF:humic acid of 0.08:0.01:0.010 g. It suggests that pH plays role in co-precipitation of humic acid and silica and the resulting electrical properties.

Keyword: pH effect, Silica co-precipitation, Humic acid, Electrical properties