

Treatment of Cyanide Effluents with Platinum Impregnated on Mg-Al Layered Hydroxides

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Abstract : Cyanide leaching is the most used technology for gold mining industry, which produces large amounts of effluents requiring treatment. In Ecuador the development of gold mining industry has increased, causing significant environmental impacts due to the highly use of cyanide, it is estimated that 10 gr of extracted gold generates 7000 liters of water contaminated with 300mg/L of free cyanide. The most common methods used nowadays are the treatment with peroxodisulfuric acid, ozonation, H₂O₂ and other reactants which are expensive and present disadvantages. Several methods have been developed to treat this contaminant such as heterogeneous catalysts. Layered double hydroxides (LDHs) have received much attention due to their wide applications like a catalysis support. Therefore, in this study, Mg-Al/ LDH was synthesized by coprecipitation method and then platinum was impregnated on it, in order to enhance its catalytic activity. Two methods of impregnation were used, the first one, called incipient wet impregnation and the second one was developed by continuous agitation of LDH in contact with chloroplatinic acid solution for 24 h. The support impregnated was analyzed by X-ray diffraction, FTIR and SEM. Finally, the oxidation of cyanide ion was performed by preparing synthetic solutions of sodium cyanide (NaCN) with an initial concentration of 500 mg/L at pH 10,5 and air flow of 180 NL/h. After 8 hours of treatment, an 80% of oxidation of ion cyanide was achieved.

Keywords : catalysis, cyanide, LDHs, mining

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