

## عنوان مقاله:

Cyanide ion oxidation by catalytic effect of nickel ferrites activated carbon composites

## محل انتشار:

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## خلاصه مقاله:

**BACKGROUND AND OBJECTIVES:** Cyanide is a commonly-used substance in the gold recovery processes due to its high affinity for forming complexes with the precious metal, but inadequate handling and its final arrangement can lead to severe environmental contamination. In this context, this research focuses on the preparation of nickel ferrite-activated carbon catalysts for catalytic oxidation of cyanide ion in the presence of air. **METHODS:** Hydrated salts of nickel ( $\text{Ni}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$ ) and iron ( $\text{Fe}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$ ) were used as precursors. The preparation pathways of ferrite and of ferrite-activated carbon composites were hydro-chemical with oxalic acid ( $\text{C}_2\text{H}_2\text{O}_4$ ) and co-precipitation with sodium hydroxide. The parameters evaluated for catalyst preparation were Ni/Fe molar ratios (1/1.5 and 1/2), calcination times and temperatures (2-4 h/600-900°C), and ferrite-activated carbon mass ratios in the case of composites (1/1, 1/2 and 1/3). **FINDINGS:** Oxidation results showed that the ideal Ni/Fe molar ratio was 1/2, and the calcination time was 4 h at 600 and 900°C for co-precipitation and hydro-chemical pathways of nickel ferrites, respectively. The catalyst that showed the greatest capacity for cyanide transformation was that obtained by the hydro-chemical pathway with oxalic acid, achieving efficiencies of 96.3% oxidation of cyanide ion. It was also determined that the largest impregnation of ferrite on the carbonaceous surface was 52.6% through the treatment with oxalic acid, with which the composite was obtained with the best catalytic properties of cyanide ion. **CONCLUSION:** Nickel ferrite is able to oxidize cyanide ion to cyanate ion; being the ferrite-activated carbon combination, with which composite materials with catalytic properties of cyanide ion are obtained. Because of this, the materials studied could be applied in the detoxification of cyanurate solutions from metallurgical processes.

## کلمات کلیدی:

Activated carbon catalysts, Co-precipitation catalysts preparation, Cyanide oxidation, Hydro-chemical catalysts preparation, Nickel ferrite catalysts

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