



AREA: Synthesis and characterization of catalysts and adsorbents

The magnetic fraction of coal fly ash: separation and Properties

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Abstract

Fly ash is an abundant byproduct of industrial waste that presents a huge environmental concern regarding its disposal. Given this, the sustainable use of ash as a renewable support material in the property of materials has been growing in recent years. In this context, the present work aims to extract magnetic particles from fly ash derived from coal combustion and modify them through different routes for future photocatalytic applications. The fly ash (FA) was preconditioned for the removal of magnetic particles (MF₀) and then modifications were carried out with oleic acid and NaOH, obtaining samples MF₁ and MF₂, respectively. The materials obtained were characterized by X-ray fluorescence, X-ray diffraction, infrared spectroscopy, scanning electron microscopy, vibrating sample magnetometer and hyperthermia. The characterization of the particles allowed the understanding of their microstructural, morphological and magnetic characteristics, as well as the identification of the material composition. X-ray diffraction analyses of the samples indicated the presence of the crystalline phase of iron oxides, hematite and magnetite phases. The change with oleic acid allows for greater saturation magnetization (18 emu/g) compared to many samples, and consequently a greater response in the presence of a magnetic field. Thus, the results indicated that the removal and chemical treatment made it possible to obtain magnetic particles with optimized properties, thus contributing to future applications as photocatalysts.

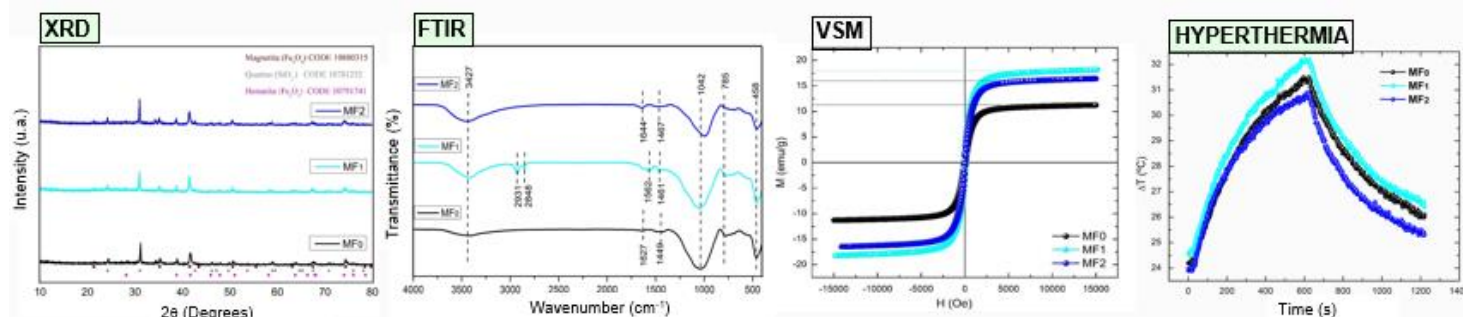


Fig. 1. XRD; FTIR; VSM and Hyperthermia analysis of the magnetic particles from the fly ash (MF₀, MF₁ e MF₂).

References

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