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ÁREA: Síntese e caracterização de catalisadores e adsorventes

Síntese e caracterização de materiais híbridos, microporosos e mesoporosos H-Y/MCM-41

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Resumo-Abstract

The use of sustainable fuels, aims to reduce the environmental impacts caused by dependence on fossil sources, but it still presents challenges. Production from fossil sources generates greenhouse gas emissions and causes environmental damage, such as the excessive use of natural resources. Furthermore, there is a risk of negative impacts on ecosystems and biodiversity, necessitating chemical and technological solutions that minimize these effects. In this context, the work focuses on the synthesis of catalysts such as microporous zeolite H-Y (FAU), the mesoporous material [Al]-MCM-41, and the hybrid H-Y/MCM-41, which play a crucial role. These catalysts offer unique properties that optimize chemical reactions, increasing efficiency and sustainability. These materials were characterized by X-Ray Diffraction (XRD) showing similarity with patterns, Thermogravimetric analysis (TGA) to determine the thermal stability and calcination temperature of each material. The SiO_2/AlO_3 ratio was determined by Wavelength Dispersive X-Ray Fluorescence (WDXRF) to be 4.55, 32.20 and 58 respectively. The morphology of the materials was well defined by Scanning Electron Microscope (SEM), the N_2 adsorption and desorption analysis showed that the surface area of the materials determined by the NLDFT method were 506 m^2/g, 1527 m^2/g and 978 m^2/g respectively. The significantly higher surface area of [Al]-MCM-41 suggests its potential for enhanced catalytic activity, while the properties of the hybrid material indicate a balance between the microporous and mesoporous characteristics. In conclusion, the synthesis and characterization of these catalysts demonstrate their promising potential. By leveraging the unique properties of zeolite H-Y, [Al]-MCM-41, and H-Y/MCM-41, it is possible to enhance catalytic processes that contribute to the development of high-value-added products. This work not only supports the transition towards more sustainable energy solutions but also highlights the importance of innovative materials in addressing the challenges faced by different sectors dependent on fossil fuels.

Palavras-chave: catalyst, synthesis, characterization

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