

Use of the mechanical method to obtain the ZSM-5/ γ -Al₂O₃ membrane from calcined kaolin

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MFI membranes are ceramic materials formed by a ceramic layer and a layer of zeolite ZSM-5 (Zeolite Socony Mobil-Five) of the type MFI, used in the separation of gases, pervaporation or in catalytic reactors, due to characteristics such as: hydrophobic properties; High thermal and mechanical stability. In recent years, due to the nature and mineralogical composition, caulin has been used as a source of silica in the synthetic preparation of zeolites, since caulin is a natural material that has a SiO₂/Al₂O₃ ratio required for the zeolites and with properties Suitable for environmental use. These factors raise the interest in studying and developing zeolite synthesis processes from calcinated caulin for its application in the area of environmental technology. The mechanical method, used in this work, is based on a simple methodology, low cost and high efficiency, opening possibilities of final products with lower cost and free of defects. The objective of this study was to synthesize the ZSM-5/ γ -Al₂O₃ membrane by alternative source such as kaolin using the mechanical method and characterize it by X-ray diffraction (XRD) analysis. ZSM-5 zeolite was synthesized based on the Mobil® method, using kaolin as an alternative source, from the reactants: calcined kaolin, water, sodium aluminate, sodium hydroxide and tetrapropylammonium bromide. The zeolite membrane ZSM-5 was obtained by the mechanical method. The analysis (XRD) was performed on the α -Al₂O₃ support, the ZSM-5 and the ZSM-5/ γ -Al₂O₃ membrane. Both analyzes showed the formation of characteristic peaks of the materials. The X-ray diffraction (XRD) of ZSM-5 and γ -Al₂O₃ confirmed the formation of the ceramic membrane structure (ZSM-5/ γ -Al₂O₃).