SYNTHESIS AND CHARACTERIZATION OF GA-ZSM-5 ZEOLITE BY SOL-GEL METHOD FOR FUTURE APPLICATION IN TISSUE ENGINEERING

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The zeolites are a aluminosilicate with a crystalline structure and properties as adsorbent and bioactive. The zeolite ZSM-5 has a low content of alluminium, is homogeneous with microporous structure and with a organophilic character. In this work we present the synthesis of ZSM-5 zeolite using the sol-gel method at room temperature with continuous agitation. Also giving a new thermal treatment using microwaves to reduce the time of drying in comparation with other conventional methods. We varied the concentration of gallium nitrate (Ga(NO$_3$)$_3$) as source of gallium and alluminium nitrate (Al(NO$_3$)$_3$) as source of alluminium in the structure. By this way we are replacing ions of gallium and reducing the alluminium to improve and give new properties adding a new biocompatible element in the structure. Once obtained the material were washed, filtered and characterized using X-ray diffraction (DRX), scanning electron microscope (SEM), termogravimetric analysis and energy dispersive spectroscopy (EDS). The XPS characterization demonstrated that Ga atoms replaces Al atoms in the zeolite structure. Finally the product Ga-ZSM-5 was studied in FFS solution to know the biocompatibility, this was for 7, 14 and 21 days. The characteristics obtained in Ga-ZSM-5 material make them a suitable candidate for for future application in biomedical engineering and use it as a new kind of biomaterials.

Keywords: Sol-gel method, Biomaterials, Zeolites ZSM-5

References:


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