عنوان مقاله:

Influence of synthesis parameters on the properties of nanostructured γ-Alumina using plackett-burman experimental design

محل انتشار:

مجله بین المللی ابعاد نانو, دوره 9, شماره 4 (سال: 1397)

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خلاصه مقاله:

Mesoporous nanostructured γ-Al۲O۳ powders were synthesized through multi- step precipitation procedures using the pH-swing technique. Structural and morphological characteristics in addition to the thermal behavior of the procured samples were characterized via X-ray diffraction (XRD), field emission scanning electron microscopy (FESEM), fourier transform infrared (FT-IR) spectroscopy, thermogravimetry-derivative thermal gravimetric (TG-DTG) and N۲ adsorption–desorption isotherm. Plackett-Burman design was implemented as a screening method to examine the impacts of fifteen variables on physical properties of synthesized γ-Al۲O۳ as a response variable. Specific surface area, pore volume and average pore diameter of the prepared samples were found to be within the ranges of ۷۲-۳۳۵.۷ m۲/g, ۰.۲۶-۱.۰۳ cm۲/g and ۴.۶-۱۵.۲ nm, respectively. It was determined that the variables including pH value on the acidic region, time in the alkaline region and number of pH-swing frequencies had major effects on the pore diameter of the procured γ-Al۲O۳ powders. Calcination by steaming had the most significant effect on specific surface area, while the pH value on the acidic region had the greatest impact on pore volume.

کلمات کلیدی:

Mesoporous, Multi-step precipitation, nanostructure, pH-swing, Plackett-Burman

لینک ثابت مقاله در پایگاه سیویلیکا: