

Study of the effect of irradiation in pseudoboehmite obtained from $AlCl_3$ as precursor

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The thermally induced transformation of pseudoboehmite through the transition of aluminas to corundum is well known in the literature. The X-rays powder diffraction is a technique used to study the phase transformation of aluminas with the increase of temperature of firing. In this work, a pseudoboehmite was obtained by sol-gel synthesis using aluminium chloride and ammonium hydroxide as precursors. The samples were irradiated with electrons to study the effects of radiation in the structure of the aluminas obtained from the pseudoboehmite. It was used a 2^4 full factorial experimental design for studying the effect of the temperature of synthesis, the concentration of $AlCl_3$ precursor, the addition of poly(vinyl alcohol) ($[C_2H_3OH]_n$) solution (8 wt% in water) in the reaction mixture, and the radiation dose in the product of the sol-gel synthesis. The 16 samples obtained in different synthesis conditions were calcined at $1100^\circ C$ and analyzed by X-rays powder diffraction. Thermo gravimetric analysis (TG) and differential scanning calorimetry (DSC) were used to determine the loss of mass and the endothermic and exothermic transformations. A well crystallized α -alumina was obtained at $1100^\circ C$ for the not irradiated samples. The X-ray powder diffraction data shows that in some irradiated samples calcined at $1100^\circ C$ there were a presence of θ -alumina and α -alumina.

Keywords: α -alumina, θ alumina, pseudoboehmite