Institute of Chemical Engineering

Chemical and structural characterization of amorphous and crystalline alumina obtained by alternative sol-gel preparation routes

Publication date:	02.04.2021
Publication title:	Chemical and structural characterization of amorphous and crystalline alumina obtained by alternative sol-gel preparation routes
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Journal information:	Materials

Aluminum oxide is one of the most commonly used materials in the industry. It is used in the field of catalysis, refractories, and optics. Despite the fact that there are many techniques available, there is still a great challenge in obtaining a material with desired and designed properties. Nevertheless, there is a great flexibility in making customized alumina materials with desired physicochemical properties synthesized by sol–gel methods. This work consists in characterizing the physicochemical properties of sol–gel synthesized aluminum oxide using different sol–gel preparation routes. Three different sols were obtained by using organic precursors and underwent thermal treatment. The structure (Middle Infrared Spectroscopy, Diffused Reflectance Infrared Spectroscopy, X-ray Diffraction, Magic Angle Spinning Nuclear Magnetic Resonance) and microstructure (Scanning Electron Microscopy with Electron Dispersive Spectroscopy) tests of the materials were carried out. The specific surface area was determined by using the Brunauer–Emmett–Teller (BET) method. Thermal analysis was performed for all the powders, in order to analyze the specific temperature of materials transformation.

Metryczka

Published by:	Marek Tańczyk

Published at:	08.05.2026 15:04
Number of views:	3