# ABSTRACT TITLE-FONT: Inorganic materials in the form of xerogels, aerogels and nanopowders

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**ABSTRACT (Calibri 12) (Maximum number of words 350)**

The synthesis of four rare-earth zirconate nanomaterials in the form $Ln_2Zr_2O_7$ where Ln(III) = La, Nd, Dy, and Gd was archieved. We isolated these materials in the form of nanopowders, xerogels, and aerogels. Thus, it is a comparative study based on the structural characteristics of these nanostructured materials, using a variety of techniques such as X-ray diffraction (XRD), Raman spectroscopy, scanning electron microscopy (SEM), $N_2$ adsorption−desorption porosimetry, differential scanning calorimetry (DSC), and thermogravimetric analysis (TGA). By compiling all structural data, we showed that, in addition to the chemical composition, the synthetic method and drying protocol have a major impact on the final structural characteristics of the nanostructured materials [1]. Powders were synthesized via co-precipitation, while wet gels were prepared via the sol−gel technique. Ambient drying of wet gels led to xerogels and drying in supercritical $CO_2$ led to aerogels. Our findings suggest that the synthesized powders consist of nanoparticles arranged in a dense microstructure with a very small specific surface area and porosity. The xerogels and the aerogels are built from nanometer-sized globules. The xerogels are microporous, and the aerogels display a large size distribution of pores [2,3].

**KEYWORDS:** Zirconates, Nanopowders, Xerogels, Aerogels, Rare-earth ions

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