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STRUCTURAL CHARACTERIZATION AND ELECTRICAL PROPERTIES OF SINTERED MAGNESIUM-TITANATE CERAMICS

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In this article the influence of ball miling process on structure of $MgO\text{-}TiO_2$ system, along with its influence on electrical properties of post-sintering samples, were investigated. Mixtures of $MgO\text{-}TiO_2$ powders were mechanically activated in a planetary ball mill for time interval from 0 to 120 minutes. On thus obtained powders, structural investigations have been performed. N_2 adsorption method was used to determine the BET specific surface area and pore size distribution. Unusual results were obtained: specific surface area continuosly decreases up to 40 minutes of activation and after that increases, reaching its minimun value of 5.5 m^2/g. The influence of mechanical activation on lattice vibration spectra was examined by Raman spectroscopy at room temperature. For sintered samples characterization, Raman scattering spectroscopy has been used. Very similar spectra for all samples were observed. Raman spectroscopy of sintered samples indicates a presence of two phases, while varieties in spectra were explained with different ratio of present phases. Effect of activation and sintering process on microstructure was investigated by scanning electron microscopy (SEM). Electrical measurements showed difference in dielectric constant (ε_r), loss tangent ($tg\delta$) and specific resistance (ρ) as a function of time of mechanical treatment.