Serbian Ceramic Society Conference
ADVANCED CERAMICS AND APPLICATION X
New Frontiers in Multifunctional Material Science and Processing

Serbian Ceramic Society
Institute of Technical Sciences of SASA
Institute for Testing of Materials
Institute of Chemistry Technology and Metallurgy
Institute for Technology of Nuclear and Other Raw Mineral Materials

PROGRAM AND THE BOOK OF ABSTRACTS

Serbian Academy of Sciences and Arts, Knez Mihailova 35
Serbia, Belgrade, 26-27. September 2022.

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material. Here, for the first time two combinations of rare earth dopant ions, Yb^{3+}/Ho^{3+} and Yb^{3+}/Tm^{3+}, with different mutual ratios were chosen as pairs for inducing up-conversion. Sol-gel assisted combustion synthesis, which comprises citric acid as chelator and glycine as fuel, was used to obtain powdered samples that are subsequently thermally treated for 3.5 h at 1100°C. X-ray powder diffraction analysis (XRPD) was performed to determine crystal structure. Morphology characteristics were observed by scanning and transmission electron microscopy (SEM/TEM). Photoluminescent up-converting properties were measured in function of laser power (976 nm) in order to define optimal doping concentration and up-conversion mechanism.

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Related effects of $Ca_{1-x}Gd_xMnO_3$ (x = 0.05, 0.1, 0.15, 0.2) compound

Milena Rosić[1], Maria Čebela[1], Jelena Gulicovski[1], Vladimir Dodevski[1], Sanja Krstić[1], Milan Kragović[1]

[1]Laboratory for Material Science, Institute of Nuclear Sciences „Vinča“, National Institute of the Republic of Serbia, University of Belgrade, PO Box 522, 11001 Belgrade, Serbia

We have used theoretical and experimental methods to investigate the octahedral tilting and related effects of $Ca_{1-x}Gd_xMnO_3$ (x=0.05, 0.1, 0.15, 0.2) compound. Both methods have shown that orthorhombic-perovskite structure (space group *Pnma*) is the most stable form and according to Glazer's classification belongs to $a^-b^+a^-$ tilt system. Our bond valence calculations (BVC) have shown ten additional perovskite-related modifications of the equilibrium $Ca_{1-x}Gd_xMnO_3$ structure, and their stability has been investigated as function of Gd doping. We have further studied the influence of gadolinium amount on Mn-O bond angles and distances, tilting of MnO_6 octahedra around all three axes and deformation due to the presence of Jahn-Teller distortion around Mn^{3+} cation, and calculated the amount of Mn^{3+} in the system. The infrared reflection spectra of $Ca_{1-x}Gd_xMnO_3$ samples confirmed XRD results that $Ca_{1-x}Gd_xMnO_3$ nanopowders are of *Pnma*-1 structure and that the tilting of octahedra are increased with Gd doping. The EPR spectra are in accordance with the assumption that EPR linewidth is Mn-O-Mn angle dependent. The studied samples showed that small octahedra tilting in these samples brought only a small change of the EPR linewidth.