qualitative/quantitative analysis of the EXAFS/XANES spectra of the annealed samples, respectively. This analysis showed that the signal is a combination of signals coming from both Mn monomers and "*N-mers*".

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P-05

High-resolution Powder Diffraction Study of $Ca_9R(VO_4)_7$ (R = La, Gd) Crystals

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Keywords: powder diffraction, vanadate

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Whitlockite is a mineral of the formula $Ca_9(MgFe)(PO_4)_6PO_3OH$ (*R*3*c* space group). Whitlockite-related materials form an extended family of compounds. Those of the $Ca_9R(VO_4)_7$ formula (R = a rare earth) are considered for applications in optoelectronics, *e.g.*, in white-light emitting diodes and lasers. In the $Ca_9R(VO_4)_7$ structure the R atoms partially occupy the Ca sites with occupation depending on the choice of the R atom. In this work, $Ca_9R(VO_4)_7$ (R – La, Gd) single crystals are studied. They were grown by the Czochralski method. The structure was refined using the powder diffraction data collected at a high-resolution synchrotron beamline. The structural details of the samples will be discussed.

P-06

Evaluation of zirconia dioxide tetragonal phase degradation introduced by grinding with dental burr

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Thanks to the evolution of CAD/CAM systems, zirconia is increasingly popular as ceramic material for dental restorations. Most often zirconia is used as modified yttria (Y_2O_3) tetragonal zirconia polycrystal (Y-TZP). Between the different ceramics utilized in dental prosthodontics, zirconia shows optimum properties: superior toughness, strength, and fatigue resistance, excellent wear properties and biocompatibility. Pure zirconia presents the phenomenon of allotropy, that is, same chemical composition but different in atomic arrangement, namely: orthorhombic, monoclinic, tetragonal, cubic, liquid. Y-TZP is a metastable material, however incorrect dental processing may induce unfavorable phase transitions, gaining more monoclinic amount and in turn, corrupting mechanical properties of the material [1,2].

The aim of the analysis was verification of the influence of dental processing protocols, on phase transition of yttrium stabilized zirconium dioxide. Evaluation of Y-TZP structure was performed with scanning electron microscopy (SEM) and X-ray diffraction (XRD). Zirconia samples were grinded with different dental burs (varies in diamond grit size) to simulate the procedures that usually the material undergoes. At the same time recorded with infrared camera for evaluation of generated temperature.

XRD study revealed impact of mechanical processing methods on the range of transition from tetragonal to monoclinic phase of the tetragonal zirconia polycrystals. The results were correlated with process accompanying generated temperature.

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