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Dr. Nina Obradović

Institute of technical sciences of SASA, Belgrade, Serbia

Wollastonite based ceramics for water purification

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Seminar room S2.02
CEITEC BUT, Purkynova 123

The first part of the lecture is going to be about Serbian academy of sciences and arts, Institute of technical sciences of SASA, and research projects that I am working on, regarding electroceramics, titanium-based. The second part will be about the synthesis of porous wollastonite-based ceramics for water purification. Ceramic precursor, methyl hydro cyclosiloxane, together with micro-sized CaCO_3 , was used as starting material. After 20 min of ultrasound treatment, and calcination at 250 °C for 30 min, yeast as a pore-forming agent was added to the as-obtained powders. Sintering regime was set up based on the results obtained by differential thermal analysis. Prepared mixture was pressed into pellets and sintered at 900 °C for 1 h. After the sintering regime, porous wollastonitebased ceramics was obtained. The phase composition of the sintered samples, as well as microstructures, was analyzed by X-ray diffraction method and SEM. In a batch test, the influence of pH, contact time and initial ion concentration on adsorption efficiency of As^{+5} , Cr^{+6} , and phosphate ions on synthesized wollastonite-based ceramics were studied. Time-dependent adsorption was best described by pseudo-second-order kinetic model and Weber-Morris model that predicted intra-particle diffusion as a rate-controlling step of the overall process. High adsorption capacities 39.97, 21.87, and 15.29 mgg^{-1} were obtained for As^{+5} , Cr^{+6} , and phosphate ions, respectively.