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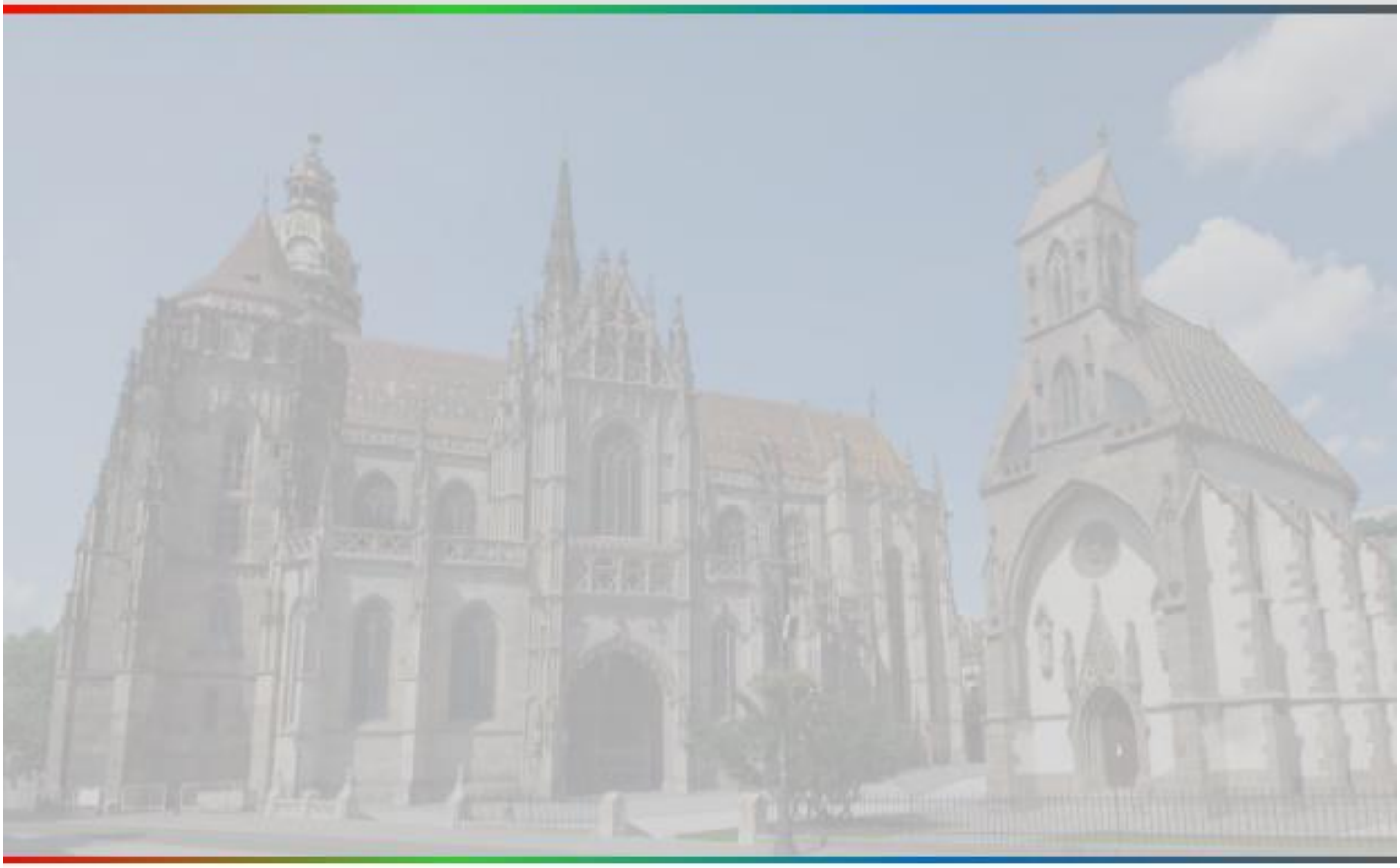

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Mechanochemical synthesis of sulfur nanoparticles via reaction of sodium thiosulfate with crystalline acids

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Sulfur nanoparticles were synthesized via mechanochemical reaction $Na_2S_2O_3{\times}5H_2O$ + yCA(crystalline acids) + zNa_2SO_3 = $(z+1)Na_2SO_3$ + yCA(catalyst) + $5H_2O$ + S^0_n(nanosulfur) in a matrix of sodium sulfite (diluent and non-target reaction product). As the crystalline acids, the organic oxalic $H_2C_2O_4$, citric $C_6H_8O_7$ and inorganic tungsten H_2WO_4 acids were selected for our study. In the previous work, obtained sulfur nanoparticles (~100 nm) via reaction of sodium thiosulfate with succinic acid were characterized by the scanning electron microscopy (SEM), transmission electron microscopy (TEM), dynamic light scattering (DLS), X-ray diffraction and thermal analysis [1]. Dilution parameter z was calculated theoretically for each system based on reagents density and their molar mass. Free sulfur nanoparticles were separated from the powder mixture by washing with ultra-pure water taking in account low solubility of sulfur. DLS results showed that the size of sulfur nanoparticles after mechanochemical activation with oxalic acid was at ca. 69 nm ($z=z_1=20$) and ca. 34 nm ($z=z_2=7.7$). Also size of sulfur nanoparticles which obtained via the reaction with citric acid were measured after preparation DLS aliquots. In this solution, size of sulfur nanoparticles characterized by a bimodal distribution with maximum 120 and 400 nm ($z=2$). Particle size of mechanochemical synthesized sulfur nanoparticles, using tugsten acid, ranged from 43 nm to 89 nm at $z = 6.65$.

References

[1] F. Kh. Urakaev, A. I. Bulavchenko, B. M. Uralbekov, I. A. Massalimov, B. B. Tatykaev, A. K. Bolatov, D. N. Zharlykasimova, M. M. Burkitbayev, Colloid J., 78 (2016) 210-219.

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