Poster Presentation

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Influence of high pressure on amino acids and their multicomponent crystals

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The studies of molecular crystals at high pressures help to understand intermolecular interactions, their role in the formation of crystal structures and in crystal structure response to external actions. Multicomponent crystals are promising for high-pressure research since a large number of phenomena has been observed for them [1]. Crystals of amino acids, their salts and co-crystals are of special interest in this respect. They are promising as new materials and can serve as biomimetics since the structure forming units of these crystals are similar to those in biomolecules. The aim of this study was to follow the effect of increasing pressure on crystal structures of amino acid salts and co-crystals to compare the results with those obtained for individual amino acids. Glycine, alanine, serine and their corresponding salts with carboxylic acids were chosen as objects of the study. Single-crystal X-ray diffraction and Raman spectroscopy were used as main experimental techniques. Three different types of behavior of salts on increasing pressure as compared with individual crystals were observed. For some salts, adding the second component stabilized the crystal structure with respect to phase transitions [2]. In the second group, on the contrary, the salts underwent phase transitions at relatively low pressures, though individual components did not undergo phase transitions at least up to 8-10 GPa. The last, third group of salts showed phase transitions in a similar pressure range as the individual components, but the mechanism of the transition changed. The phase transitions were accompanied either by crystal structure disordering, or by switching-over hydrogen bonds [3]. This work was supported by a grant from RFBR (12-03-31541 mol_a), by the Ministry of Education and Science of Russia, Russian Academy of Sciences, and by a grant of President of Russia for State support of Russian leading Scientific Schools (project NSh-279.2014.3).

[1] *E. Boldyreva. Z.Krist, 2014, 229, DOI 10.1515/zkri-2013-1699, in press,* ***[2]*** *V.S. Minkov, E.V. Boldyreva, T.N. Drebushchak et al., CrystEngComm, 2012, 14, 5943-5954,* ***[3]*** *B.A. Zakharov, E.V. Boldyreva, Acta Crys. B., 2013, 69, 271-280*

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