Polymorphism of Crystalline Amino Acids. The Role of Non-covalent Interactions

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The crystals of amino acids are interesting from several points of view – as drugs, as molecular materials (e.g. piezo- and ferroelectrics), but also as biomimetics. Understanding the effects of pressure, temperature, and various chemicals on the crystal structures of these compounds can give a better insight into the properties of hydrogen bonds and of other, weaker, non-covalent interactions in these systems. This can, in turn, be helpful for getting a better understanding of the conformational changes induced by temperature, pressure, or chemicals in the biopolymers built from amino acids (peptides). In the contribution we shall illustrate this by the results of recent X-ray single-crystal and X-ray powder diffraction, Raman and IR-spectroscopy studies at variable temperatures and pressures, as well as of the DSC and adiabatic calorimetry studies from 5K to the decomposition temperatures.

[1] Boldyreva E.V., et. al., *Z. Krist.*, 2005, **220**, 58. [2] Boldyreva E.V., et. al., *Z. Krist.,* 2005, **220**, 50. [3] Goryainov S.V., et al., *Physica B,* 2005, *in press*. [4] Boldyreva E.V., et al., *J. Therm. Analys. Calorim*., 2003, **73**, 409-428.

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