s9'.m1.o1 **Multistabilities, Metastabilities, Phase Transformations and Chemical Reactions in Molecular Solids - an overview.** T. Luty. *Instytut Chemii Fizycznej i Teoretycznej, Politechnika Wroc³awska, 50-370 Wroc³aw, Poland.*
Keywords: molecular interactions, organic materials, molecular solids.

Although intrinsic to each solid, the multistability is particularly fascinating for molecular solids, where there is almost unlimited possibility to tune the ground state (and properties) by virtue of the coupled electronic and structural ordering. Various kinds of transformations then appear under perpetual conflict between the competing metastable states which are hidden underneath the apparent silence of the ground state. With the progress in experimental structural studies, particularly techniques of diffuse and time resolved X-ray scattering, there is a growing interest in studies of structural aspects of various transformations (polymorphism, polyamorphism, chemical reactions). From molecular perspective a competition and cooperation between local and global structures becomes a common problem and allows for unified picture of phase transitions and chemical reactions. The picture stresses mesoscopic aspect, a formation of molecular nanostructures. We shall discuss the transformations within a scheme, where the structural and electronic orderings will be related to dimensionality of intermolecular interactions, competition and cooperation between local and global structures, finally equilibrium (static) and non-equilibrium (dynamic) transformations. Special attention will be focused on structural aspects, which brings information about electronic structures, within a molecule, a nanostructure or macroscopic level. Concepts used to understand the variety of transformations within the unified picture will be illustrated by examples, most intensively studied in recent years.

s9'.m1.o2 **Solid state polymerization reactions leading to biomaterials.** M. Epple, O. Herzberg, K. Schwarz, M. Siedler. *Solid State Chemistry, Faculty of Chemistry, University of Bochum, D-44780 Bochum, Germany*
Keywords: molecular crystals, solid state reactions, polymers

Alkali halogenocarboxylates undergo polymerization reactions upon heating, eliminating an alkali halide. As an example, sodium chloroacetate reacts to sodium chloride and polyglycolide (or poly-hydroxyacetic acid):

$$Na^{+-}OOC\text{-}CH_2\text{-}Cl \rightarrow NaCl + 1/n\ \text{–}[\text{-}OOC\text{-}CH_2\text{-}]_n\text{-}$$

This reaction occurs in a number of halogenocarboxylates. For the case of halogenoacetates, it could be shown by analysis of the packing of the molecules in the crystals that it most likely occurs in a topochemical way.

The resulting polyesters (polyglycolide for halogenoacetates and polylactide for 2-halogenopropionates) are prominent biomaterials, e.g. in surgery of orthopedics. Conventionally, they are prepared by ring-opening polymerization from the cyclic lactones.

We could show that the solid-state chemical polymerization leads to these polyesters in special morphology, i.e., containing small pores of the micrometer-size. This property should be advantageous for biomedical applications, as it allows a better control over bicompatibility and biodegradability.

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