Materials Chemistry under High Pressures – Some Recent Aspects

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Among the thermodynamic parameters governing the preparation of novel materials, temperature (T) and pressure (p) play an important role. In Materials Chemistry, the synthesis of materials needs energy in order to enhance the diffusion of atoms to the equilibrium positions required by the specific structure and to induce the formation of chemical bonds. The comparison of the energy conveyed by both parameters (p and T) underlines that high pressures can be associated – in liquid or solid media – with soft processes. Consequently this paper describes the main factors induced by the parameter pressure that are able to support new structural forms or generate novel materials. Two different approaches are presented: (i) for a given composition with characteristic chemical bonds, high pressures can induce structural transformations, (ii) high pressures lead to the formation of novel materials from different precursors through the formation of new chemical bonds.

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