

High Pressure and Chemical Bonding in Materials Chemistry

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Dedicated to Professor Wolfgang Jeitschko on the occasion of his 70th birthday

Materials chemistry under high pressures is an important research area opening new routes for stabilizing novel materials or original structures with different compositions (oxides, oxoborates, nitrides, nitridophosphates, sulfides,...).

Due to the varieties of chemical compositions and structures involved, high pressure technology is also an important tool for improving the investigations on chemical bonding and consequently the induced physico-chemical properties.

Two different approaches can be described: (i) the chemical bond is pre-existing and in such a case, high pressures lead to structural transformations, (ii) the chemical bond does not exist and high pressures are able to help the synthesis of novel materials. In both cases the condensation effect ($\Delta V < 0$ between precursors and the final product) is the general rule. In addition, through the improvement of the reactivity, high pressures can lead to materials that are not reachable through other chemical routes.

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Novel Materials, Chemical Bonding