

Materials under Extreme Conditions: Molecular Crystals at High Pressure

By Roberto Bini, Vincenzo Schettino

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High-pressure materials research has been revolutionized in the past few years due to technological breakthroughs in the diamond anvil cell (DAC), shock wave compression and molecular dynamic simulation (MD) methods. The application of high pressure, especially together with high temperature, has revealed exciting modifications of physical and chemical properties even in the simplest molecular materials.

Besides the fundamental importance of these studies to understand the composition and the dynamics of heart and planets' interior, new materials possessing peculiar characteristics of hardness and composition have been synthesized at very high pressure, while unexpected chemical reactions of simple molecules to polymers and amorphous compounds have been found at milder conditions.

The variety of the phenomena observed in these extreme conditions and of the materials involved provides a common ground bridging scientific communities with different cultural and experimental backgrounds. This monograph will provide a timely opportunity to report on recent progress in the field.

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