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High-pressure minerals in the Earth and planetary materials

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Shocked meteorites are the most important sources of high-pressure minerals in addition to impact crater rocks, diamond inclusions and mantle xenoliths. In most cases, natural high-pressure minerals occur as submicron-sized grains. However, state-of-art techniques such as transmission electron microscopy and synchrotron X-ray diffractometry enabled the identification of such small crystalline grains. As a result, many of natural high-pressure phases of silicates and oxides have been discovered in the past 15 years. Textural, crystallographic and chemical characteristics of the natural high-pressure minerals provide us not only the clues to understand the impact events of meteorite parent bodies, but also insights on the structure and dynamics of the deep Earth. In this talk, we summarize the occurrences and discovery histories of the natural high-pressure minerals.

Keywords: High-pressure minerals, phase transformation, meteorites, shock metamorphism, TEM