High-pressure mineralogy: state of the art and future.

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Last decade has seen a tremendous improvement in the understanding of the interiors of the Earth and other planets. Many of these advances are due to better understanding of the micorscopic behaviour and physical properties of planet-forming materials at high pressures and temperatures. In this Lecture I will review several latest achievements, e.g.:

1. The discovery of the post-perovskite phase of $MgSiO_3$ [1,2].
2. The discovery of a new phase of alumina (Al_2O_3) and its potential geophysical implications [3].
3. Derivation of a thermal model of the Earth's mantle [4,5].
4. Studies of Fe at conditions of the Earth's core [6,7].

The major challenges, e.g. systematic exploration of new phases and studies of rheological properties [8], will be discussed as well.

References:

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