

Physics and Chemistry of the Earth's mantle

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Date: 2.22-2.23.2018 (Fri.) 9:00 – 16:00

Venue: Meeting Room #486, Science

Research Bldg 1, Ehime Univ.



**You can download and use the educational materials in this lecture.
Please bring your mobile computer.**

Basic understanding of physical and chemical properties of mantle materials is essential for investigating the structure and dynamics of the Earth's mantle. In this lecture, we will discuss the following three topics from various background knowledges necessary for study of the Earth's interior.

Part 1: Thermochemistry of binary solutions

The major mantle minerals such as olivine, pyroxenes, wadsleyite, ringwoodite, garnet (majorite), bridgmanite, ferropericlase and post-perovskite are ferromagnesian minerals. Therefore, binary chemical equilibrium is vital to understand the structure of the mantle. In this lecture, we will discuss thermochemistry from its basis to equilibrium of non-ideal solutions.

Part 2: Equation of state

Density is an essential parameter to investigate the structure and dynamics of the Earth's interior. To describe change in density as a function of pressure and temperature, various kinds of equation of states were proposed. In this lecture, we will discuss equation of states frequently used in geophysics for investigation of the Earth's mantle.

Part 3: Electrical conductivity

Electrical conductivity is a physical parameter of the Earth's interior that can be remotely estimated from the Earth's surface. We will discuss electrical conduction mechanism in upper-mantle minerals, and attempt to explain geophysical observation on conductivity structures of the oceanic asthenosphere.