Geodynamics Seminar

第326回ジオダイナミクスセミナー

Development of the high-pressure X-ray diffraction experiments and the study of the Earth's deep interior

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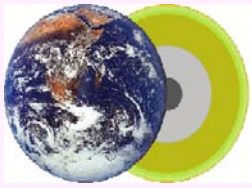
主催：愛媛大学地球深部ダイナミクス研究センター
日時：4/20（金）午後 4時30分～
場所：総合研究棟 4F 会議室



EHIME UNIVERSITY GRC GEODYNAMICS RESEARCH CENTER

Abstract

I am going to talk about the development of high-pressure in situ X-ray diffraction experiments in the last 50 years, together with my own research history, and our understandings of the Earth's deep interior. X-ray diffraction under high pressure provides us very basic information on the property of minerals in the deep Earth, such as crystal structure, stability field, and equations of state of the minerals. It also allows us to determine the pressure values of the experiment accurately, which is very important to compare the results of laboratory experiment with seismic observations,

Although X-ray diffraction study on minerals has started at around 1930, experiments under pressure have started in 1960's. In the early stage, people used either Bridgman-type or diamond-anvil type apparatuses and the measurements were made only at room temperature. By adopting large-volume apparatus, people have started high temperature experiments but at the beginning pressure range was quite limited. Since then, the pressure range was extended enormously by the improvements of both X-ray source and high-pressure apparatus. X-ray source has changed from sealed X-ray tube to synchrotron radiation via rotating anode high power generator. High-pressure apparatus has changed from WC anvils to sintered diamond anvils. Combination of laser-heated diamond anvil apparatus with the very thin X-ray beam from the synchrotron radiation dramatically extended the pressure and temperature range of the experiments and now it is possible to get high quality data even at the condition corresponding to that of the Earth's center.

Using the information obtained through these experiments, our understandings of the Earth's deep interior has changed quite a lot and now we believe that we know the basic structure of materials constituting the entire Earth.

In the lecture, I am going to talk about above history in more detail and will talk about the perspective of high-pressure mineral physics.

詳細は当センターホームページ: http://www.ehime-u.ac.jp/~grc/をご覧ください
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