Geodynamics Seminar

第340回ジオダイナミクスセミナー

Pressure estimation using “diamond Raman” method at low-pressures below 10 GPa

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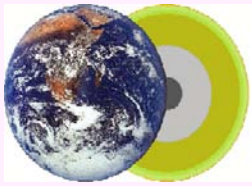
主催：愛媛大学地球深部ダイナミクス研究センター
日時：10/26（金）午後 4時30分～
場所：総合研究棟 4F 会議室



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Abstract

In diamond anvil cell experiments, pressure is usually estimated by the ruby fluorescence method (Mao et al., 1978, 1986), “diamond Raman” method, and Equation of state of pressure standards such as NaCl, MgO, Au. Among them, the first two method are useful readily and widely used, since they do not require in-situ X-ray diffraction measurements of the pressure standards. Although the ruby fluorescence method is usable from very low-pressure as small as 0.06 GPa, in the case of experiments with fluids such as supercritical water it is concerned that ruby grains could react with the fluid, and the composition of the system might change at high-temperature. Here, we tested a potential application of the “diamond Raman” method for pressure estimation below 10 GPa. “Diamond Raman” method is a relatively new pressure estimation and uses the shift of high-frequency edge of the first-order Raman mode of diamond collected from the anvil culet surface. In general, this method cannot be used at low-pressures below 10 GPa due to overestimation of pressure, because the high-frequency edge position of the diamond Raman peak from the anvil surface is not very clear at low-pressure (< 10 GPa) when using a conventional micro-Raman spectroscope. We found that the high-frequency edge position can be clearly recognized and its shift is well calibrated against pressure even below 10 GPa when using a highly confocal Raman spectroscopy manufactured by PhtonDesign, which has recently been installed in our institution. In this talk, I will discuss the applicability of “diamond Raman” method for pressure measurement at low-pressure.

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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