

The 14th Global-COE International Frontier Seminar

October 5th, 2009, from 17:00, at the room# 486 meeting room 4F

Behavior of Xe-SiO₂ and Xe-Fe systems under the condition of the Earth's interior —Application to the “Missing Xenon Problem”—

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“Missing Xenon” is a long standing, yet unsolved problem. Earth's atmosphere is highly depleted in Xe compared to the abundance of rare gasses in C1 chondrite and more than 90 % of the Xenon expected to exist is missing. Various possibilities have been suggested to explain this missing Xenon, including the formation of compounds with silica in the crust and alloying into iron in the Earth's core. The latter possibility was highly anticipated particularly after the finding that the Xenon becomes metallic with hcp structure above about 120 GPa. Because, iron is also an hcp metal in these conditions. We have studied the behavior of Xe-SiO₂ and Xe-Fe systems up to about, respectively, 10 GPa and 150 GPa, using laser heated diamond anvil cell combined with synchrotron X-ray diffraction. For the Xe-SiO₂ system, a detailed analysis of the recovered sample using TEM was also carried out. All these experimental results clarified that Xenon does not form any compounds with these materials under the condition of the Earth's interior. Moreover, no detectable amount of the dissolution of Xenon into these materials was observed at all. All these results suggest that it is very difficult to retain “missing Xenon” inside the Earth and we have to find some other way to solve this problem.

5 October 2009 17:00-18:00
Room 486, meeting room 4F
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