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MIS002-07

Room:104

Time:May 27 16:00-16:15

## Formation of hydrocarbons and graphite by polymerization of methane molecules under the Earth's mantle conditions.

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High-pressure and high-temperature experiments of olivine-methane-water and olivine-methane systems were performed using a laser-heated diamond anvil cell at a pressure range from 5.4 to 29.4 GPa and a temperature range from about 1600 to 2000 K corresponding to conditions of the upper mantle to the top of lower mantle. X-ray diffractometry, Raman spectroscopy, and transmission electron microscopy revealed that methane molecules polymerized under existence of olivine to form heavier hydrocarbon, graphite. A difference in the products was not observed between the present study and the previous studies of sole methane. The present result suggests there is no effect of olivine to polymerization of methane molecules. The present study demonstrates polymerization of methane occurs in the Earth's mantle and that is consistent with previous studies on finding some hydrocarbons in mantle-derived minerals.

Keywords: methane, olivine, hydrogen, polymerization, laser heated diamond anvil cell