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Molecular Routes Syntheses of Nano-structured C and C-N Compounds in High Pressure and Temperature using LH-DAC KEN NIWA, MASASHI HASEGAWA, TAISHI HORIBE, YUKI JIN, KEIJI KUSABA, Nagoya University, KEISUKE YASUDA, RYOYA ISHIGAMI, Wakasa-wan Energy Research Center — Molecular routes syntheses in high pressure and temperature are powerful to obtain novel materials, especially carbon-based inorganic compounds. We have tried to synthesize new nano-structured C and C-N inorganic compounds from heterocyclic compounds in high pressure and temperature using a Laser-Heated Diamond-Anvil Cell (LH-DAC) system and characterized by XRD, SEM-EDX, TEM-EELS, Raman, RBS and ERDA. Some heterocyclic organic compounds were reacted to various kinds of nano-structured carbons such as nano-diamonds, carbon nano-tubes and carbon nano-cones. We have also synthesized graphite-like nano-structured C-N compounds using this technique. They showed petal-like morphology similar to "carbon nano-wall." The thickness of petals was several tens of nm. Petals were found to have a graphite-like layer structure on the basis of TEM experiments. It was found that the c-axis lattice constant changes almost linearly as a function of the analyzed nitrogen content. We will also report synthesis results of nano-structured C/C-N compounds using GPa-range supercritical fluid in DAC.

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