

Abstract Submitted
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Local fluctuations in the transformation to amorphous diamond from neutron-irradiated graphite and C₆₀ fullerenes under shock-compression¹ KEISUKE NIWASE, Hyogo University of Teacher Education, KAZUTAKA.G. NAKAMURA, Tokyo Institute of Technology, TADAO IWATA, Japan Atomic Energy Research Institute — Shock compression and rapid quenching (SCARQ) technique is a unique method to obtain metastable carbon materials, transformed from initial carbon phase in a flash. Here, we report local fluctuations in the transformation to amorphous diamond from neutron-irradiated highly oriented pyrolytic graphite (HOPG) and C₆₀ fullerene under SCARQ. For the recovered sample of neutron irradiated graphite, we found an appearance of domain boundary between optically transparent and opaque areas. Raman spectroscopy revealed that the transparent and the opaque areas correspond to transformed and untransformed areas, suggesting some martensitic transformation in the highly disordered structure of neutron irradiated graphite. For C₆₀ fullerene film, on the other hand, we recovered platelets after SCARQ at 52 GPa and observed a small Raman peak of diamond with a background of photo luminescence utilizing 488 nm excitation. The peak shape changed depending on the area or the platelets. Peak fitting revealed that the diamond Raman peak shifts to lower frequency with increasing the peak width and decreasing the peak intensity, indicating local fluctuations in the structure of the recovered sample.

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