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MD Simulations of the Condensation of Carbon Atoms for Comparison with Graphitic Stardust LINDSAY LESH, ERIC MANDELL, Bowling Green State University — The objective of this research is to simulate the quenching (rapid-cooling) of carbon droplets of various sizes with various quench times for comparison with graphitic stardust found in primitive meteorites. The meteoritic carbon formations of interest exhibit a core-rim structure, where the core – with a density less than that of the graphitic rim – comprises the majority of the grain. There is reason to hypothesize that the cores of these grains are the result of the rapid freezing (quenching) of a liquid carbon droplet. Since the liquid phase of carbon is extremely difficult to investigate in laboratory conditions due in part to its high melting point, molecular dynamic simulations are an attractive method for examining the behavior of carbon as it is rapidly cooled from a gaseous state. The resulting condensates from these simulations have been analyzed using radial distribution function (RDF) calculations and debye scattering calculations to simulate electron diffraction data.

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