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Formation of nanostructured arrays through magnetic ramp compression RANDY J. HICKMAN, TOMMY AO, JACK L. WISE, HONGYOU FAN, Sandia National Laboratories — Recently, pressure-driven assembly of spherical nanoparticles and formation of one to three dimensional, nanostructured arrays have been demonstrated using diamond anvil cells. Extending the pressure-driven assembly of nanostructured arrays from static diamond anvil cells to dynamic compression techniques has been studied. Shock compression would be unsuitable for synthesis of nanostructures because the evaluated temperatures of shock states would induce melting of nanoparticles. However, magnetic ramp compression has been demonstrated to produce smooth, shockless loading with low temperature states suitable for nanostructure synthesis. Experiments have been performed on the Veloce pulsed power generator to ramp compress nanoparticles into nanostructured arrays, which utilizes a soft-recovery assembly to retrieve formed nanostructure samples. Sandia National Laboratories is a multi-program laboratory operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

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