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Geometrically Structured Dynamic Shadowing Lithography: Structural Growth and Control[1] SHENGRONG YE, AARON ROUTZAHN[2], R. LLOYD CARROLL[3], Department of Chemistry, West Virginia University — Sphere lithography (SL), or nanosphere lithography (NSL), stands out as a versatile technique capable of producing 2D periodic micro- and nanostructures using colloidal crystal as deposition mask. Many of the fundamental aspects of the features produced by SL have been extensively investigated, including the optical, magnetic, electronic, and catalytic behaviors with emphasis toward applications in biosensing, ultrasensitive spectroscopy, and nanodevice fabrication. Previous work has primarily focused on 2D patterning, however, with little attention paid to vertical growth of the SL features. In this work, we will demonstrate the 3D structural evolution of metal dot arrays by SL-based geometrically structured dynamic shadowing lithography (GSDSL). The resulting structure is highly dependent on the nature of the metal that is used as evaporative source. We will specifically focus on the difference in the grain size of several typical metals and illustrate the ability in control of the structural growth through experiment and modeling. We believe that knowledge of the detailed geometry will enable us to understand further information on the physical and chemical properties of the SL substrates.

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