Colliodal Arrays & Nanosphere Lithography

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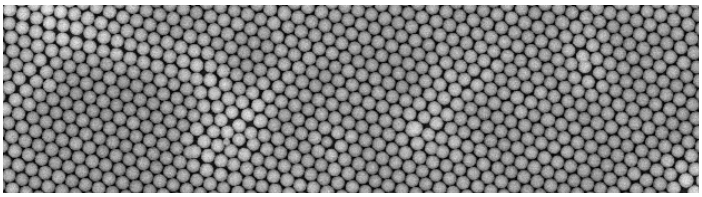

A variety of applications exist in which uniform spherical nano- or microparticles are deposited onto a solid substrate or in some type of 3-D matrix in a highly ordered fashion, e.g. as self-assembled monolayers or close-packed lattices for creating equidistant spacing[1,2], nanosphere lithography[3-7,19], colloidal crystal assembly,[7-13] generating photonic crystals[14-16], fabricating gradient surfaces,[17] biomolecular micropatterning,[18] etc. After bead deposition some of these applications involve the filling or modification of interstices with a material that solidifies. The beads are then fully removed or otherwise altered in order to create highly uniform pores or patterned nanostructures in the solidified material. These modified materials find utility in various optical, semiconductor, and biosensing applications.[1-17,20]

Numerous techniques exist for depositing beads such as: 2D self-assembly at double- or triple-phase boundaries, spin-coating, ink-jet printing, sedimentation (via gravity, centrifugation, or filtration), convective assembly and electrophoretic methods, two-substrate vertical deposition via confinement between thin films, slit filling, and physical methods such as compression or compaction of dried particles, etc.[1-18] Likewise, a variety of methods have been employed to fill interstices (e.g. polymerization or sol-gel hydrolysis of a liquid precursor, electroless or electrochemical deposition, precipitation, deposition of smaller colloidal particles[7]) or to modify mask openings in nanosphere lithography (e.g. thin-film deposition, sputter erosion, and ion implantation[4]). Techniques for partially or fully removing beads in order to create uniform pores include oxygen plasma treatment, calcination, and chemical dissolution, e.g. organic solvents for polymer beads, strong acid for silica beads, etc.[5,8,10]

Due to their stringent size and shape uniformity, our polymer, and silica microspheres have been widely used in the types of applications cited above.[3,11,13,15,16] Ranges for standard bead diameters offered and our complete inventory of available lots, as well as a wide variety of additional microsphere products may be found at **www.bangslabs.com**.

PS, PS COOH: ~25nm – 90µm
silica: ~150nm – 5µm

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