Formation of gold nanoparticle assemblies in responsive polymer brushes STEPHANIE CHRISTAU, North Carolina State University, REGINE VON KLITZING, Technical University Berlin, JAN GENZER, North Carolina State University — The modification of surfaces by means of polymer brushes has become an active area of research during the past few years due to numerous potential applications of such systems in nano- and biotechnology. The structure and conformation of a brush depends on external stimuli such as pH, temperature or solvent type and can be manipulated by varying these attributes. This stimulus-response can be exploited for the development of smart surfaces and for sensor applications. Furthermore, brushes can be used as 3D matrices for immobilization of nanoparticles. In this study, responsive brushes are used as a matrix for the attachment of gold nanoparticles (AuNPs); this hybrid system exhibits intriguing optical properties due to the surface plasmon resonance of the AuNPs. We address the effect of some system parameters such as synthetic procedure, brush thickness, brush grafting density, particle size and particle incubation time on the characteristics of the resultant particle-impregnated brushes. We also discuss the spatial distribution of the AuNPs inside the brush with regard to the particle size, brush density and brush molecular weight.

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Date submitted: 15 Nov 2013   Electronic form version 1.4