

Arrays of bimetallic nanoparticles obtained by the block copolymer inverse micelle method

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We used self-assembled block copolymer templates to generate arrays of bimetallic nanoparticles. In this approach, a block copolymer consisting of hydrophilic and hydrophobic blocks is dissolved in a selective solvent such as toluene in order to obtain inverse micelles. The core of such inverse micelles can then be functionalized with metal precursors ligated by complexation or protonisation to the inner polymer block. The reverse micelles can then be transferred from the solution to the substrate by using, for instance, standard spin or dip-coating techniques. The obtained layer exhibits a rather high degree of hexagonal order, reflecting the packing of spherical micelles.

We present results on the formation of arrays of both PdAg and PdAu nanoparticles obtained by this method. For the latter a specific study on the stability of the array at high temperatures under oxygen pressure was performed within an objective-lens aberration-corrected environmental transmission electron microscope (Titan ETEM G2 80-300 kV from ThermoFisher Scientific).