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A SAXS study of the impregnation of pH-responsive polymeric microgels with metal nanoparticles S.H. ANASTASIADIS, E. PAVLOPOULOU, M. VAMVAKAKI, K.E. CHRISTODOULAKIS, Foundation for Research and Technology-Hellas and Univ. of Crete, Heraklion Crete, Greece, G. PORTALE, W. BRAS, ESRF-DUBBLE, Grenoble, France — We follow the synthesis of metal nanoparticles within poly(2- (diethylamino)ethyl methacrylate), PDEA, microgels by SAXS. Colloidal Pt nanocrystals are formed within the microgels by the incorporation of the appropriate metal precursor, i.e., H_2PtCl_6, followed by metal reduction. We report the structural study of these systems by SAXS during the three steps of the metal nanoparticle synthesis: the original dispersions in water, the metal-loaded polymer matrices and the metal-nanoparticle-containing microgels after reduction. The scattering profiles of the pure microgel dispersions exhibit two contributions; a Porod-like wavevector q contribution arising from the water/microgel interface and a power law fractal contribution due to the microgel network. Both the Porod and the power-law scattering are still evident after metal incorporation, while the shoulder appearing at higher q's can be attributed to the formation of domains of higher scattering intensity due to the aggregation of the ion- neutralized hydrophobic polymer within the microgels. After metal reduction, Pt nanoparticles are formed with sizes of around 1.5 nm in diameter. Sponsored by NATO's Scientific Affairs Division, by the Greek GSRT and by the EU.

Spiros Anastasiadis
Foundation for Research and Technology-Hellas

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