Thermal Properties of Nanofluids Containing Polymer-Protected Au/Pd Bimetallic Clusters Suspended in Ethylene Glycol

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Colloidal dispersions of polymer-protected Au/Pd (5/1) bimetallic clusters were prepared by simultaneous reduction of the ions of their corresponding chloride salts in ethylene glycol in the presence of poly(N-vinyl-2-pyrrolidone) (PVP). UV-Vis spectroscopy, TEM and HREM were used to characterize the samples. The bimetallic clusters were relatively uniform in size (4.3 nm in average diameter). In this work we report about (inverse) photopyroelectric measurements of the effective thermal effusivity of the nanofluids formed in the above described way. Following a comparison between different theoretical approximations we have estimated other thermal properties of the samples such as their thermal conductivity by means of a simple phenomenological model describing the relationship between the measured parameter and the nanoparticles volumetric fraction.