^{1}H NMR CHARACTERIZATION OF ORGANIC AND INORGANIC NANOPARTICLES

D. Maggioni, D. Donghi, M. Panigati, G. D'Alfonso, T. Beringhelli

Università degli Studi di Milano, Dipartimento di Chimica Inorganica, Metallorganica e Analitica "Lamberto Malatesta" Via Venezian, 21, 20133 Milano, Italy.

Drug delivery employing nano-object as liposomes, polymer conjugates, and nanoparticles suspended in solution is a subject of high current interest [1]. The characterization of the size and the surface functionalization of these nanoparticles is of primary importance. Microscopy techniques give information on deposited colloidal samples, after solvent evaporation, so that the correspondence with the nature of the species in solution is not granted. Dynamic Light Scattering (DLS), which is usually used to estimate the size of a colloidal sample in solution, can overestimate the radii of very small nanoparticles [2]. Diffusion NMR, and in particular Pulsed gradient spin-echo (PGSE) technique, has recently emerged as a valuable tool for colloids characterization [3], complementary to DLS from the point of view of the size evaluation, being highly reliable for the measurement of the smallest particles. Moreover, NMR provide information not only on the size, but also on the interaction between the capping ligands and the nanoparticle surface. In this work, we present the characterization through ^{1}H PGSE NMR measurements of the size of spherical and rod-like TiO_2/oleic acid nanoparticles and of conjugates between Re complexes and polyamidoamine nanoparticles. Moreover, by ^{1}H NMR experiments the interaction between TiO_2 and the capping oleic acid (OA) has been characterized.

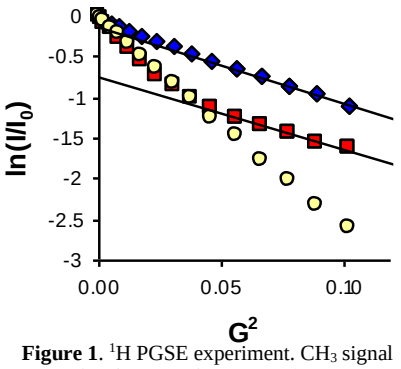

Figure 1. ^{1}H PGSE experiment. CH_3 signal decay for: ◊ = TiO_2@OA; □= TiO_2@OA with an excess of OA; ○ = free OA

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