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NANO-4

ANALYSIS OF NANOPARTICLES HYDRODYNAMIC DIAMETERS IN BROWNIAN MOTION

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Brownian motion is the random movement of particles in the fluid. These movements are caused by collisions with molecules of the liquid. Speed of these movements is dependent on many factors like the particle size and temperature. Trajectories of individual particles (Particle Tracking technique) is an example of the direct measurement method of Brownian motion. It involves the measurement of light reflected from the particles, in these case nanoparticles, or emited by fluorescent nanoparticles. Diffusion coefficient, calculated by means of Particle Tracking, allows to determine directly the hydrodynamic diameter of the particles [1]. The phenomenon of the relevant differences between the hydrodynamic diameter, determined on the basis of the diffusion coefficient of nanoparticles varies, and its physical value is fairly well known in the literature. It is mainly based on effects related to the influence of solvent surface interactions, which may have a significant impact on the size of the observed hydrodynamic diameter. Such factors as the ionic strength or the surface structure of the nanoparticles (associated with the presence of surfactants) will be discussed [2].

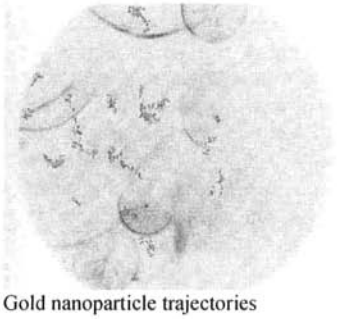

Fig. 1 Gold nanoparticle trajectories

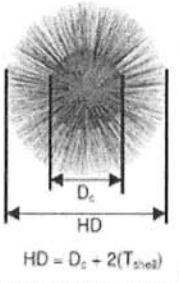

Fig. 2 Hydrodynamic and physical diameter of nanoparticle

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[1] M.J. Saxton, "Single-Particle Tracking: The distribution of diffusion coefficients", Biophysical Journal, 72, 1744-1753,
[2] C. Chassagne, M. Ibanez, "Hydrodynamic size and electrophoretic mobility of latex nanospheres in monovalent and divalent electrolytes", Colloids and Surfaces A: Physicochemical and Engineering Aspects, 440, 208– 216, 2014

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