# Various aspects of surface charge and zeta potential relationship in the area of nanocrystals, colloids, emulsions and foams

P. Warszyński

*Jerzy Haber Institute of Catalysis and Surface Chemistry Polish Academy of Sciences*

Piotr.warszynski@ikifp.edu.pl

Various aspects of the relation between surface charge and zeta potential and its consequences for the physicochemical properties of various dispersed systems will be discussed. Starting from the origin of surface charge in nanoparticles, proteins, emulsions, or bubbles, and its relationship with zeta potential based on the electric double layer theory, the illustrative example of the effect of adsorption of multivalent ions, surfactants, macroions, and polymers on measured zeta potential will be given. Therefore, the determination of the potential allows quantification of the adsorption process, for example, during the formation of hybrid polyelectrolyte/nanoparticle coating leading to the formation of nano- or microcapsules (Fig. 1).

The zeta potential is regarded as a key parameter determining the stability and rheology of dispersed systems; therefore, the role of electrostatic interactions will be described as part of the classical DLVO theory of stability. On the other hand, the value of surface charge/zeta potential and electrostatic interactions determine the deposition of colloids at macroscopic surfaces. Some illustrative examples of deposition kinetics will be presented.

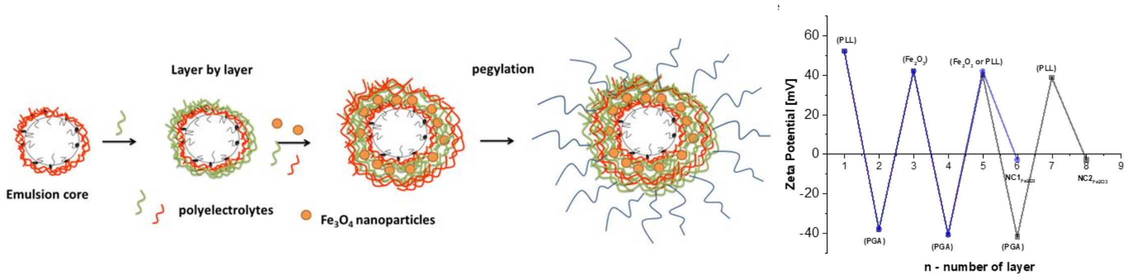

Fig. 1. Schematics of the nanocapsules formation with PEG-ylated polyelectrolyte/magnetite nanoparticles shell and corresponding zeta potential dependence after adsorption of the consecutive layer [1].

[1] L. Cristofolini, K. Szczepanowicz, et al., ACS Applied Materials & Interfaces, **8**, 25043-25050 (2016)