Negative and positive Zeta Potential controls: reliable Zeta potential values for electrophoretic mobility and streaming potential. The importance of standards.

Bárbara Riera Rousset [a], Christine Reißner [a], Cornelia Hunger [a], Kyriakos A. Eslahian [a]

[a] Applied Microspheres GmbH

riera@applied-microspheres.com

Nanoparticles are known to have an extraordinarily large specific surface area, meaning that their surface properties govern their colloidal properties and general behavior. Therefore, it is essential to determine the surface properties for the technical application of particles where adhesive surface effects play a role.
Experimentally, Zeta potential is the most accessible primary measure for determining the properties of a colloidal surface. Since the stability of charged particles against agglomeration is driven by electrostatic repulsive forces, it can be described as a function of the Zeta potential.(1)
Particle surface characteristics and charge play an important role in the particle's physical state, stability in different media, agglomeration tendencies, and interaction with biological systems. Zeta potential measurement provides an indirect measure of the net charge and as a tool to compare batch-to-batch consistency. (2)
The Zeta potential is greatly influenced by the fundamental properties of the surrounding medium, such as pH and ionic strength. Additionally, different Zeta potential determination methods cause different particle accelerations, resulting in different forces acting on the electric double layer surrounding the particle. Therefore, reliable and stable Zeta potential controls are essential to define the Zeta potential independently of the method and allow for the reasonable interpretation of the experimental results. (1)
Considering this, we have developed stable Zeta Potential Controls formulated on basis of surface-modified polystyrene particles that are either positively or negatively charged. These products are designed for the reproducible validation of Zeta potential. Thanks to a free of charged surfactants formulation, which is buffered against CO_2 intake, a significant reduction in background noise and a stable physicochemical environment could be achieve. The particle concentration has been adjusted to ensure suitability for most common experimental setups, with a defined electrophoretic mobility value, a shelf life is 12–18 months from and room temperature storage.

1)Zeta Potential Controls Applied Microspheres Product Brochure. https://www.applied-microspheres.com/products/zeta-potential-controls
2)Clogston JD, Vermilya A. Measuring Zeta Potential of Nanoparticles: Version 1.2. 2020 Apr. In: National Cancer Institute's Nanotechnology Characterization Laboratory Assay Cascade Protocols [Internet]. Bethesda (MD): National Cancer Institute (US); 2005 May 1–. NCL Method PCC-2. PMID: 39013058. **Measuring Zeta Potential of Nanoparticles: Version 1.2** Jeffrey D. Clogston , Alison Vermilya

Keywords:
Zeta Potential, Standards, Nanoparticles, Surface Properties, Colloidal Properties

References:

1)Zeta Potential Controls Applied Microspheres Product Brochure. https://www.applied-microspheres.com/products/zeta-potential-controls
2)Clogston JD, Vermilya A. Measuring Zeta Potential of Nanoparticles: Version 1.2. 2020 Apr. In: National Cancer Institute's Nanotechnology Characterization Laboratory Assay Cascade Protocols [Internet]. Bethesda (MD): National Cancer Institute (US); 2005 May 1–. NCL Method PCC-2. PMID: 39013058. **Measuring Zeta Potential of Nanoparticles: Version 1.2** Jeffrey D. Clogston , Alison Vermilya