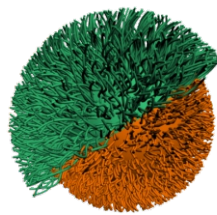
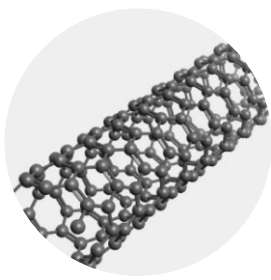


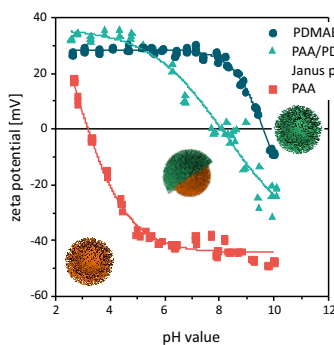
Applied Electrokinetics: Particles and Powders

The electrokinetic measurement of the zeta potential of colloidal and microscopic particles and powders give information not only on the stability of dispersions but also on charged and dissociable surface functionalities. Therefore, this is an efficient analytical method for the verification of surface functionalizations, adsorbed matter or contaminations. It provides the basis for a better understanding of the interactions between particles in dispersions and between particles and adjacent solid surfaces. The particle-matrix adhesion in composites or the adhesive strength of powder coatings, too, are determined by the functional groups at the particle surfaces.

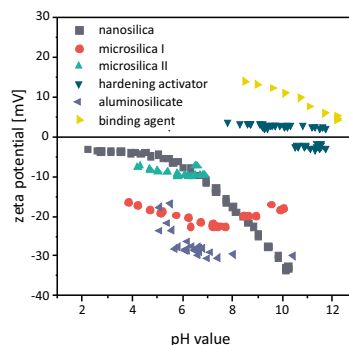


Applications

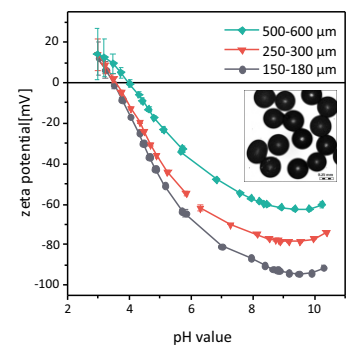
- paints, powder coatings, adhesives: dispersion stability, particle deposition, adhesion
- water purification: polyelectrolyte complexes, flocculation, membranes
- biotechnology, nanosensors: functional nano- and microparticles with different topologies and chemical patchiness (conventional and Janus spheres, rods, cubes)
- new materials: carbon-based particles, carbon nanotubes
- composite materials, lightweight construction: control of filler-matrix interactions
- medicine, food and textile technology: drug carriers, micro-capsules
- civil engineering: characterization of cement suspensions
- life science: interaction of solids with biological systems



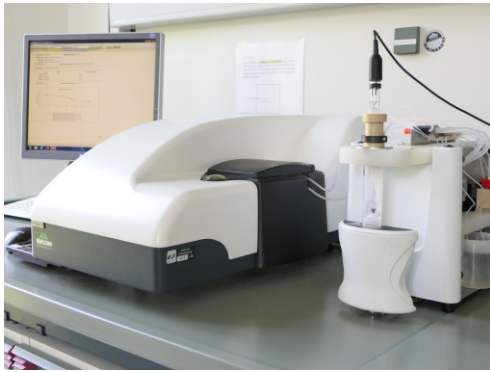
zeta potential of brush-functionalized nanoparticles and Janus particles (electrophoresis)



zeta potential of various cement components in concentrated dispersions (electroacoustics)



zeta potential of basalt microspheres of different diameter (streaming potential)



Equipment

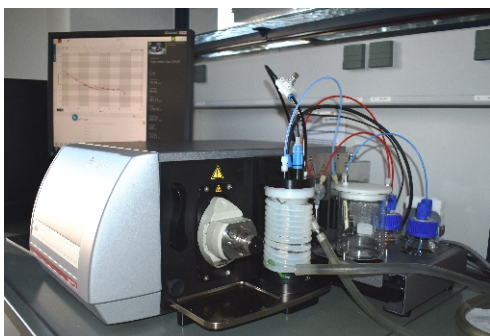
Zetasizer nano, Zetasizer 2000 (Malvern)

electrophoresis, dynamic light scattering
zeta potential and size of particles (1 nm – 10 μm)
in diluted dispersions



DT 1200 (Dispersion Technology)

electroacoustics, ultrasound attenuation
zeta potential and size of particles (1 nm – 100 μm)
in concentrated suspensions and emulsions



SurPASSTM 3 (A. Paar GmbH), ZPA 20 (DataPhysics GmbH)

streaming potential measurement
measuring cell for powder plugs
zeta potential of particles and powders (20-200 μm)

Selected publications

Bellmann, C. ; Caspari, A. ; Moitzi, C. ; Babick, F. Dynamische und elektroforetische Lichtstreuung - Leitfaden zur Partikelgrößenanalyse und Zetapotentialbestimmung. Anton Paar GmbH (2018)

Eckert, V. ; Haubold, E. ; Oswald, S. ; Michel, St. ; Bellmann, C. ; Potapov, P. ; Wolf, D. ; Hampel, S. ; Büchner, B. ; Mertig, M. ; Leonhardt, A. Investigation of the surface properties of different highly aligned N-MWCNT carpets. Carbon 141 (2019) 99-116

Marschelke, C. ; Raguzin, I. ; Matura, A. ; Fery, A. ; Synytska, A. Controlled and tunable design of polymer interface for immobilization of enzymes: does curvature matter? Soft Matter 13 (2017) 1074-1084

Nagel, J. ; Kroschwald, F. ; Bellmann, C. ; Schwarz, S. ; Janke, A. ; Heinrich, G. Immobilisation of different surface-modified silica nanoparticles on polymer surfaces via melt processing. Colloids and Surfaces A: Physicochemical and Engineering Aspects 532 (2017) 208-212

Kuhr, M. ; Synytska, A. ; Bellmann, C. ; Aibibu, D. ; Cherif, C. Methods for a permanent binding of functionalized micro-particle on polyester fabric for the improvement of the barrier effect. Journal of Industrial Textiles 46 (2016) 643-663

Bellmann, C. ; Sobolkina, A. ; Caspari, A. ; Albrecht, V. ; Grundke, K. ; Mechtcherine, V. Untersuchung der Oberflächeneigenschaften von Kohlenstoffnanopartikeln. Chemie Ingenieur Technik 88 (2016) 890-896

Contact

Leibniz-Institut für Polymerforschung Dresden e. V.

Department Polymer Interfaces

Dr. Günter K. Auernhammer

e-mail: auernhammer@ipfdd.de

P +49 (0)351 4658 486

F +49 (0)351 4658 474

Hohe Straße 6 . 01069 Dresden . Germany

www.ipfdd.de

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