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Ebatco Nano

A Bimonthly Newsletter

Vol. 3 | Issue 03
May/June 2013

Nano Brief

Thank you to all of those who were able to attend our open house and congratulations to the winners of the raffle drawings!

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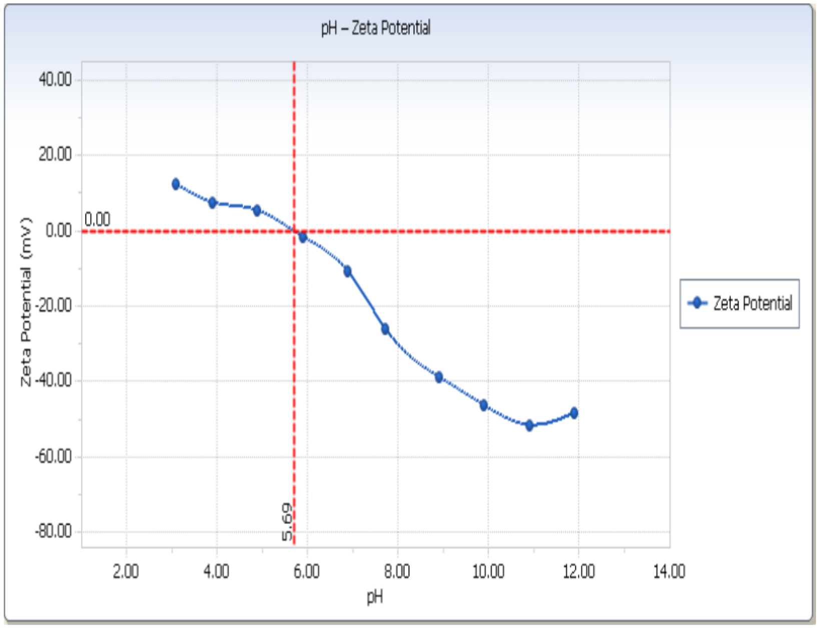
Thanks again to all of those who cared and made our very first open house a fun and successful event. We had more than 80 people stop by and visit us at our new location throughout the day on June 26th. It was great to see so many acquaintances and customers that we met over the years. It was even more encouraging that many new faces have shown up. Welcome and thank you!

At the open house, stories were told and many laughs were had alongside of the tasty food and cold drinks. We hope that you have enjoyed the tours of our facility and meeting with your peers. We understand that not everyone could make it to our open house during the busy summer. If you would like to come by and see our lab, our door is always open. Please feel free to stop by at any time!

Case Study

In colloidal systems, Zeta potential is the electric potential at the slipping plane in the double layer surrounding a particle suspended in a fluid, in reference to a point in the bulk fluid far away from the particle. In other words, zeta potential is the potential difference between the dispersion medium and the stationary layer of fluid attached to the dispersed particle. The double layer is composed of the stationary Stern layer and the diffuse layer. The Zeta potential, measured in mV at the slipping plane or the interface between the Stern layer and the diffuse layer is widely used as a measure of the particle stability in colloids. The higher the Zeta potentials absolute values are, the more stable the particles in the colloids.

Zeta potential is not measurable directly but it can be calculated using theoretical models and an experimentally-determined electrophoretic mobility. When an electric field is applied to charged particles in the colloids, particles move toward an electrode opposite to their surface charge. Since the velocity is proportional to the amount of charge of the particles, zeta potential can be estimated by measuring the velocity of the particles. Electrophoretic light scattering is the method most popularly used to determine the velocity of the particles suspended in a liquid medium under an applied electric field. In order to determine the speed of the particles, the particles are irradiated with a laser light and the scattered light emitted from the particles is detected. Since the frequency of the scattered light is shifted from the incident light in proportion to the speed of the particles movement, the electrophoretic mobility of the particles can be measured from the frequency shift of the scattered light.



Zeta potential as a function of pH for a colloidal silica polishing slurry.

For polishing slurry, stability is very important. If the Zeta potential is too low, particles will agglomerate and create large clusters. These large clusters can lead to undesired deep scratches in the polishing surface. For applications that require very smooth surfaces, these scratches can be devastating.

By using the DelsaNano C Particle and Zeta Potential Analyzer, Auto Titrator and the Flow Cell, the Zeta Potentials of a colloidal silica polishing slurry were measured as a function of solution pH values. The above figure shows the experimental results on the Zeta potentials of this colloidal silica polishing slurry from 3 to 12 pH. It was found that a pH level between 10 and 11 pH will result in the highest absolute Zeta potential values. The results indicate that the Zeta potential may be controlled by adjusting the pH level of the slurry. The possible explanation for this is that increasing or decreasing the pH level changes the amount of ions available in the slurry, which affects the charge in the double layer.

Colloid and suspension stability is important for not only polishing slurries, but also for paints, pharmaceuticals, food and beverages that have fine particles dispersed in fluids. Zeta potential can be used in these colloidal and suspension systems' dispersion control, stability and shelf life studies.

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