

Latex and Nanocomposite Particle Sizing

Technical advantages offered by the CPS Disc Centrifuge

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The Armes research group has used disc centrifuge photosedimentometry to size a wide range of latexes, sols and colloidal nanocomposite particles over the last fifteen years. Our high resolution 24,000 rpm CPS disc centrifuge was installed and commissioned in Jan 2009. We have obtained reliable results with a wide range of latexes and nanocomposite particles. This new instrument has a maximum centrifugation rate of 24,000 rpm, which is substantially faster than our old Brookhaven disc centrifuge (15,000 rpm). This means that much smaller particles can now be sized with good accuracy and reproducibility.

Our CPS disc centrifuge has proved to be particularly useful for sizing our new poly(2-hydroxypropyl methacrylate) latexes prepared by aqueous dispersion polymerisation (see A. M. Ali et al., *Soft Matter*, 2007, 2, 1003-1013). Since poly(2-hydroxypropyl methacrylate) is soluble in alcohol, these particular latexes become swollen in methanol/water mixtures, which is the normal spin fluid used for our Brookhaven instrument. This means that the solid-state particle density determined by helium pycnometry is no longer applicable, which invalidates the particle size measurement. In contrast, the wholly aqueous spin fluid used in the CPS disc centrifuge prevents latex swelling and allows meaningful particle size analyses to be undertaken (see below). A scanning electron micrograph image of the same poly(2-hydroxypropyl methacrylate) latex is included as a comparison.

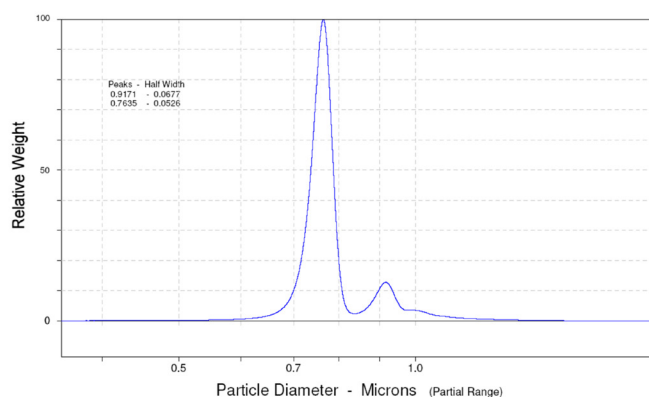


Fig.1 - Typical weight-average particle size distribution curve obtained for poly(2-hydroxypropyl methacrylate) latex using the high resolution CPS disc centrifuge

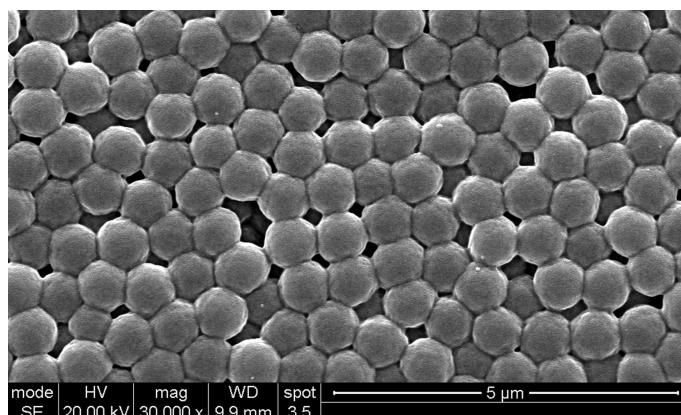


Fig.2 - Representative scanning electron micrograph obtained for the same latex

Other advantages offered by the CPS disc centrifuge are its Windows software and its mode of operation, which is well suited to sizing many samples within a typical laboratory day.

The Armes research group offers a particle size analysis service to industrial companies who may wish to take advantage of their CPS disc centrifuge facility at the University of Sheffield.

For further details of this service please contact:

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Fig.3 - Prof. Steve Armes of the University of Sheffield using the CPS Disc Centrifuge

Want to find out more?

To learn more about high-resolution particle size characterisation using the UHR CPS Disc Centrifuge visit analytik.co.uk/cps (UK and Ireland) or visit cpsinstruments.eu.