

Size Determination of Inkjet Pigment Dispersions by Nanoparticle Tracking

Introduction

NanoSight's technology provides rapid insight into the quality of sub-micron dispersions. These instruments accurately size pigment particles in suspension, combining a unique real-time view with comprehensive size determination, rapidly and at low cost.

Background

Particle size and particle size distribution remain core measures in determining the functional and handling properties of pigment-based inkjet inks. Colour density, opacity and viscosity depend directly upon particle size. As jet nozzles get smaller and more numerous and the resolution demands of customers grow, the need to fully understand agglomeration and dispersion stability increases. Existing techniques that address particle size in the sub-500 nm range have significant limitations with inkjet systems:

- Dynamic Light Scattering (or Photon Correlation Spectroscopy) is inherently limited in assessing polydisperse suspensions. This is due to the measured signal being strongly intensity-weighted towards larger particles as the scattering from deeply sub-micron particles tends to proportionality to the sixth power of their diameter
- Electron microscopy, whilst providing a detailed insight into morphology, surface structure and much more, it is inherently intrusive in preparation and provides limited statistically useful data

Sizing by NanoSight Systems

NanoSight's technology uniquely provides inkjet formulators with:

- A unique view of dispersion quality where the individual pigment particles are visualised, moving under Brownian motion
- A particle-by-particle, number size distribution of pigment particles provided by tracking the diffusion of individual particles, using video and specially developed software
- An opportunity to study time-dependent effects, using real-time observation

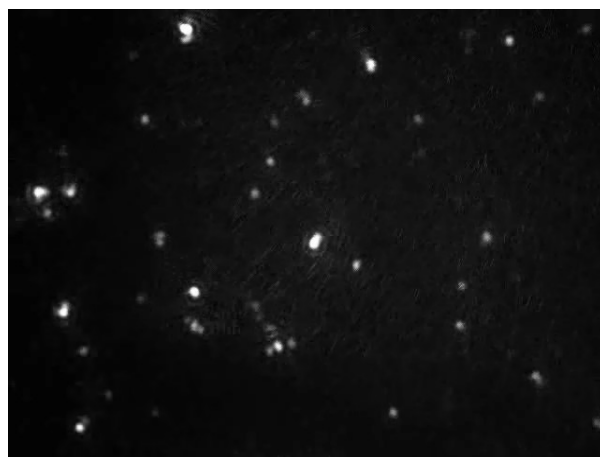


Figure 1: Commercially-available inkjet ink. A still image from NanoSight system, showing range of particles, brighter and more polydispersed than those below. [The real-time video clips are available on our web-site: these provide an information-rich view of particles in Brownian motion].

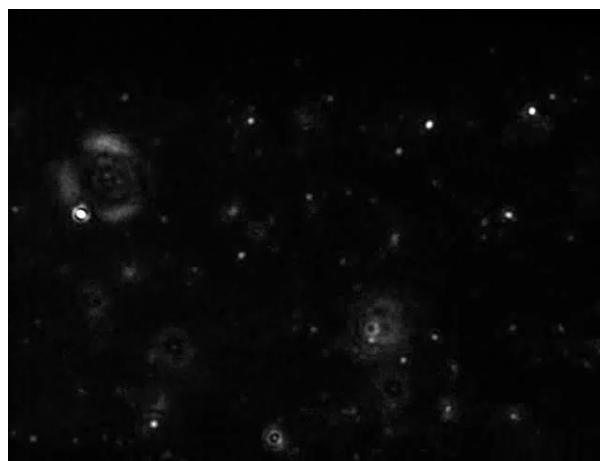


Figure 2: Advanced Digital Ink. These particles are much smaller than those above and similar in appearance (monodisperse).



Key Features

- compatible with most inkjet solvents
- proven on inorganic, organic and speciality pigments
- small sample volume
- full range of reporting functionality
- all data exportable to a spreadsheet
- rapid results
- low cost to purchase and operate

Most importantly, the particle size data is validated by a unique and informative dynamic view of the particles in suspension.

Contact Details

For further information, contact NanoSight or your local distributor, listed at www.nanosight.com

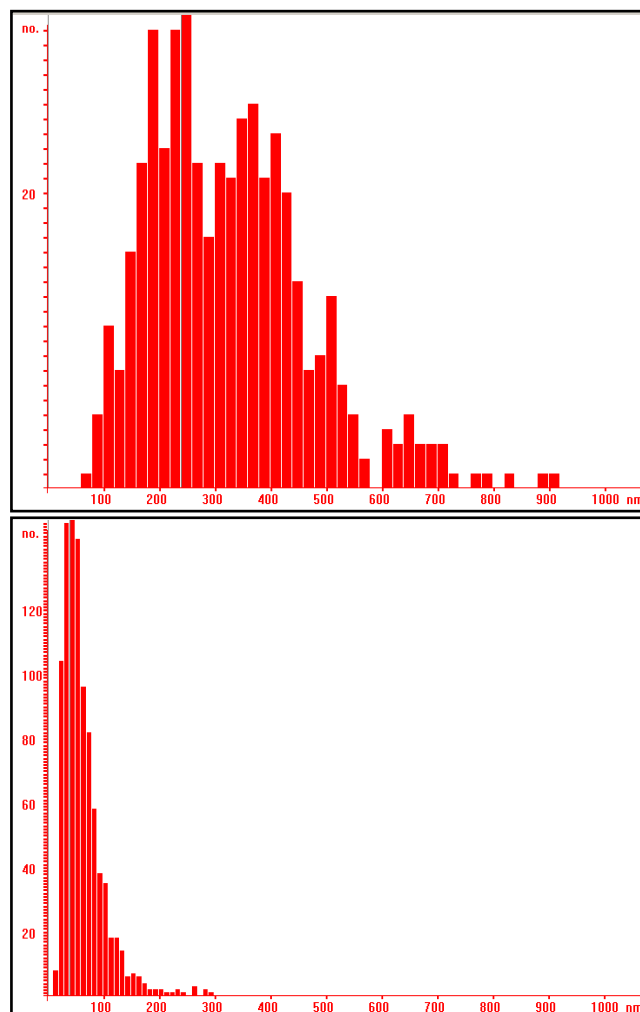


Figure 3: Comparison of NanoSight Particle Size Distributions for the two inks above, illustrating NanoSight's ability to demonstrate polydispersity, and the clear differences between them. In both cases the x-axis scale is particle diameter. The y-axis is the number count of particles at that size.

