PARTICLE/COLLOID/SUSPENSION MEASUREMENTS

- **Sonics Vibra-Cell High Intensity Ultrasonic Processor**

  This instrument can be used to process a wide range of organic & inorganic materials. Typical applications include: sample preparation, dispersion, homogenisation, desegregation, nanotechnology, particle size reduction, acceleration of chemical reactions and atomisation

Sonics Vibra-Cell

- **Homogeniser**

  Homogeniser is used to produce nanofibers from micron size fibres. Fibres suspension is poured into the homogeniser through feed hopper and run at required pressure by adjusting the pressure valves. Maximum capacity at 2000 bar is 9l/hr (approx. 150ml/min) ± 5% at 50Hz.

GEA Niro Soavi – PandaPLUS 1000-2000

- **Photometric Dispersion Analyser (PDA)**

  The PDA analyses the extent of flocculation of suspensions, control dispersion and emulsification processes. The instrument can also monitor the formation and breakage of emulsions, and is applicable for a wide range of suspension concentrations and particle sizes.

The Rank Brothers Photometric Dispersion Analyser, PDA 2000

Department of Chemical Engineering
Monash University, 15 Alliance Lane, Clayton VIC 3800
Phone: (03) 9905 3456, Fax: (03) 9905 3413
www.biopria.com.au

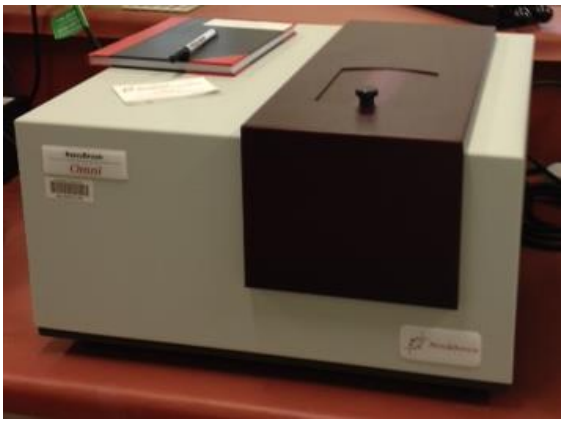
- **Charge Analysing System (CAS)**

  The CAS instrument is used to conduct particle charge analysis. Particle charge is one of the essential factors in evaluating colloidal systems. Particles with concurrent surface charge repel each other and so create a stable suspension. This can be further stabilised by adding a dispersing agent or destabilised by adding a flocculants and can thus be flocculated. Knowledge of the charge sample is significant in assessing the effect of additives and their exact dosage.

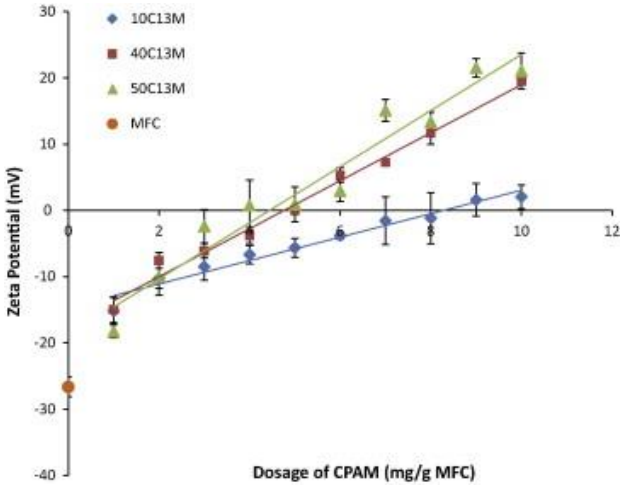
AFG Analytic GmbH Charge Analyzing System

- **NanoBrook Omni Particle Size Analyser**

  This instrument is used for particle sizing and zeta potential analysis. It measures varies samples, from high-salt suspensions to organic solvents and aqueous solutions. The NanoBrook Omni utilises a backscattering angle, 90°, 15° for particle and protein sizing measurement. Typical applications include: proteins, nanoparticles, colloids, polymers, emulsions, pigments/inks and paints.



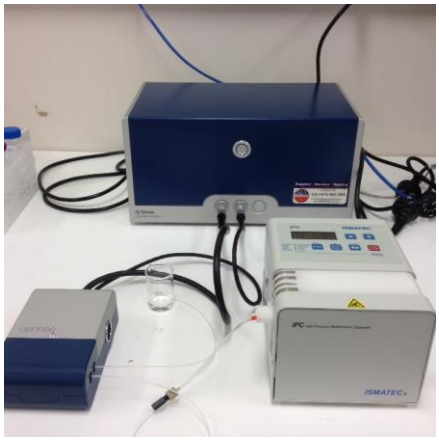
Brookhaven's NanoBrook Omni Particle/Protein Size and Zeta Potential Analyser



Zeta potential of CPAM-nanocellulose suspensions as a function of CPAM dosage (mg CPAM/g MFC).
Image taken from: Raj, P, Varanasi, S, Batchelor, W & Garnier, G 2015, 'Effect of cationic polyacrylamide on the processing and properties of nanocellulose films', *Journal of Colloid and Interface Science*, vol 447, pp. 113-119.

- **Quartz Crystal Microbalance with Dissipation monitoring (QCM-D)**

  This instrument is used for analysing surface phenomena such as: thin film formation, molecular interactions and reactions. This is critical to make better paper packaging and develop new application using polymers nanoparticle and nanocellulose. The principle of the QCM-D technology is based on measuring changes in the resonance and dissipation frequencies caused by the events that take place to the membrane that has been deposited on the surface of the sensor. The results can then be modelled to accurately determine the structural properties of membranes such as: stiffness, thickness and heterogeneity. It can also detect interaction of the membrane with other entities in real time without requiring labelling.



QCM-D

- **Dispermat CV4-Plus**

  Dispermat CV dissolver system is used to mix and disperse high viscous products. It has speed up to 20000 rpm and it can process sample from 0.05L to 10L. This instrument is useful for preparing nanocellulose/nanoparticle/polymer solutions.

Dispermat CV4-Plus

<u>Stored/set up and configuration required</u>

- **Ellipsometer** – uses an optical technique to determine film properties, especially film thickness.
- **Dynamic Mechanical Thermal Analysis (DMTA)** – measures the stress/strain relationship of materials.

Department of Chemical Engineering
Monash University, 15 Alliance Lane, Clayton VIC 3800
Phone: (03) 9905 3456, Fax: (03) 9905 3413
www.biopria.com.au