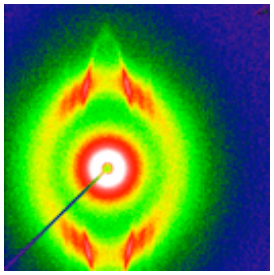

Contribution ID: **25** Type: **not specified**

Contr. Talk 2 - Orientation distributions of plate-like colloidal particles in complex flows –a synchrotron X-ray diffraction study

Monday 10 December 2018 14:30 (20 minutes)

Spatially resolved, X-ray diffraction with synchrotron radiation permits detailed maps of the alignment of crystalline colloidal particles to be deduced and compared with fluid mechanics calculations of the flow. The angular distribution of diffracted intensity from a given position in the pipe provides information about the orientation distribution of the particles. Orientational alignment in a dispersion of kaolinite particles has been investigated in several geometries. These include a uniform pipe, at bends as well as a flow pattern that combines both shear and elongational stress, namely flow at a jet created by a 2 mm diameter nozzle inserted in a 6 mm diameter pipe [1,2]. The alignment is quantified and presented in terms of order parameters. The orientation at different positions in a cylindrical pipe can be correlated with the Peclet number at different locations. The cone-shaped nozzle provides a jet of liquid giving a high degree of alignment of the particles that is uniform along lines across the conical section and constant in the small straight-sided region at the exit of the nozzle. The vortex motion that arises from the flow with a modest Reynolds number could be determined as well as the tendency for some particles to align with their large faces perpendicular to the overall flow direction at the flat surface of the nozzle outlet. Older studies will related to new challenges related to 3D-printing polymer composites.

Presenter: RENNIE, Adrian

Session Classification: Early afternoon session - Colloids