

DETERMINATION OF PARTICLE SIZE DISTRIBUTION OF NANOPARTICULATE SYSTEMS BY PACKED COLUMN HYDRODYNAMIC CHROMATOGRAPHY

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Abstract

Particle size and particle size distribution can have a fundamental effect on the physical properties of colloidal dispersions. For many systems the measurement of average particle size is not sufficient, the presence of different size populations will have a strong influence on properties and could be related to the production process. Hydrodynamic chromatography (HDC) provides a method for the separation of polymers in solution or particles in suspension based on their size. In a packed column, the separation takes place in the inter-particle channels and the elution order is from large to small, analogous to gel permeation chromatography. The dynamic range of packed column HDC is from molecular size up to particles of greater than 1 μ m. Fractionation techniques, including packed column HDC, offer advantages over non-fractionation techniques for particle sizing in that the method produces information about the average particle size and the distribution of particle size. Non-fractionation techniques, such as photon correlation spectroscopy, are less well suited for the analysis of multi-modal samples or samples with broad particle size distributions due to the low resolution of the method. This poster will describe instrumentation which can be used to determine the particle size distribution of a range of colloidal dispersions by packed column HDC. Data to support accuracy and precision of average particle size determination will be presented, as well as a number of case studies to illustrate the applicability of the technique to samples with polydisperse or multi-modal particle size distributions.

Keywords: Particle Size Distribution, Hydrodynamic Chromatography