COMPREHENSIVE CHARACTERIZATION OF SYNTHETIC POLYMERS, BIOPOLYMERS AND POLYMER-COATED NANOPARTICLES USING ASYMMETRICAL FIELD-FLOW FRACTIONATION (AF4) AND THERMAL FIELD-FLOW FRACTIONATION (TF3) COUPLED WITH ONLINE MULTI-ANGLE LIGHT SCATTERING DETECTION (MALS) AND ICP-MS

Gerhard Heinzmann, Florian Meier, Thorsten Klein

Postnova Analytics GmbH, 86899 Landsberg, Germany, info@postnova.com

Field-Flow Fractionation (FFF) is a reliable analytical tool for the separation and comprehensive characterization of Synthetic Polymers, Biopolymers, Nanoparticles and Microparticles. Principle of the FFF Separation Technique is a separation field that is perpendicular to the laminar eluent flow in a separation channel or hollow fiber (Figure 1). The separation field can be a cross flow, a temperature gradient or a gravitational field. With different FFF techniques the separation can be based on molecular weight, hydrodynamic size and chemical composition of the sample.

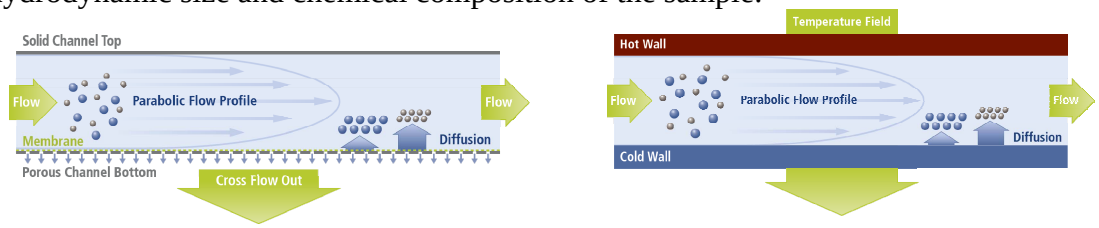

Figure 2: Principles of Asymmetrical FFF (left) and Thermal FFF (right)

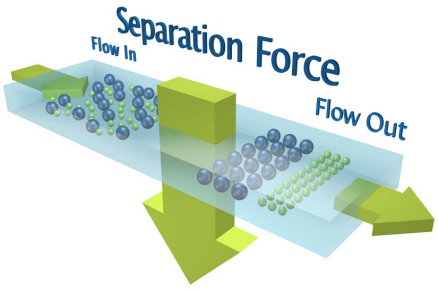

Figure 1: Principle of the FFF Separation Technique

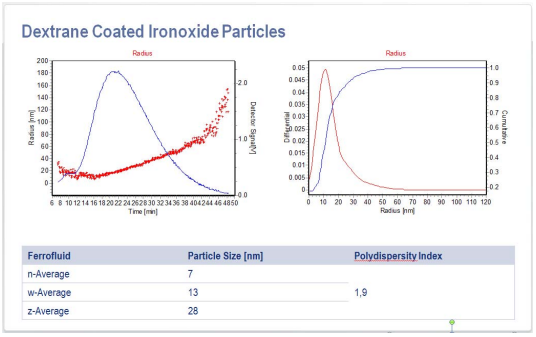

Figure 3: Separation and Characterization of Dextran Coated Iron Oxide Nanoparticles with AF4 and Multi-Angle Light Scattering (MALS)

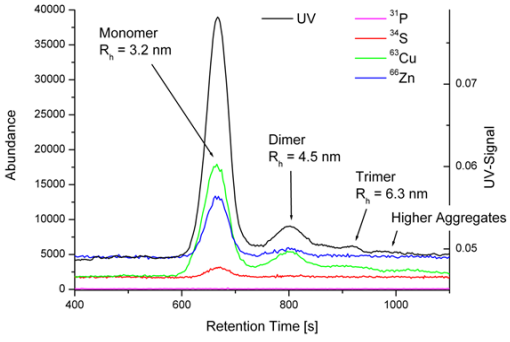

Figure 4: Separation and Characterization of Bovine Serum Albumin (BSA) with AF4 and ICP-MS

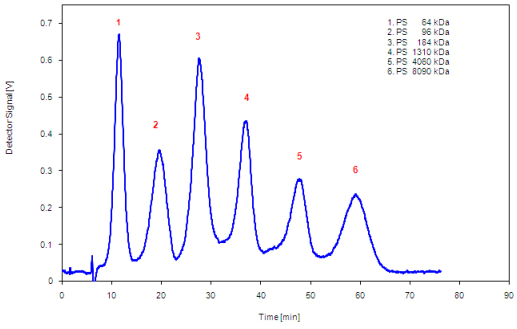

Figure 5: Separation of Polystyrene Standards with TF3