Abstract

Boise State University has invented a device used to separate fine particles, macromolecules, micelles and lipophilic proteins into groups based on their size and electrical characteristics so they can then be quantified and analyzed.

This invention is an open-channel method for separation, characterization and isolation of fine particles such as metal fines, polymers, macromolecules, micelles and lipid soluble proteins. Analytes must be dispersed in low-polarity media and the particles are separated into discrete groups by an electrical field. The separation channel is thin and "ribbon-shaped" (10-100 cm long, 1-2 cm wide and ~25 to 200 micrometers thick). A very low electrical potential (~1 volt) is applied across this thin gap thereby establishing a high electrical field. This, combined with laminar flow of the fluid, causes separation of particles or molecules into groups based on size and charge. Particles are passed by a detector at the end of the channel where they are quantified and sized. They are then eluted where they can be collected for other uses.

This instrument improves over other fine particle separation methods in several ways. First, the power requirement is very low in comparison to electrophoresis (only 1 - 2 volts). Second, the open channel configuration and low operating pressure reduce shear forces on the particles to the theoretical minimum. This is especially important when separating fragile proteins, micelles, polymers and other macromolecules. Third, electrically insulating channel walls prevent electron transfer reactions from occurring during separation; such reactions could change the identity of the analyte. Finally, the very low applied voltage prevents ohmic heating of the sample, which is a serious problem in separations based on electrophoresis.

Advantages

- This instrument separates fine particles or macromolecules into groups based on their size and electrical charge, for purification, characterization and quantitation.
- An elution technique delivers separated fractions of fine particles for end-of-channel collection and other types of analysis or use.
- Electrically insulated walls prevent electron transfer reactions.
- Very low power requirement and low applied voltage eliminate ohmic heating of sample.
- Low pressure and open channel design reduce shear forces on fragile particles to the theoretical minimum.

Boise State is looking for a Licensee for this technology.

For More Information Contact:

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