

International Conference and Expo on

Separation Techniques

August 10-12, 2015 San Francisco, USA

Magnetohydrodynamic electrophoresis: A novel fully validated method in bio/chemical analysis

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There is a continuing need for fully validated and cost effective separation methods to meet the increasingly exacting demands of medicine, pharmaceutical science, industry and the environmental field, covering areas such as proteomics, biotechnology and related sciences. This work sets out to address this issue by radically improving the performance of electrophoretic techniques particularly capillary electrophoresis (CE). Applications are expected in all areas of bio/chemical analysis. The full potential of CE is not being realised routinely because of the relatively poor reproducibility, the adverse effect of EOF (electroosmotic flow) and the non-optimal resolution obtained with molecules like proteins/peptides that can be adsorbed onto the capillary wall. There is a need for greater efficiency and stability in detecting all the components in complicated analytical profiles and better efficiency in achieving the fine separations normally required in chiral analyses. The work described here is based upon the application of magneto-hydrodynamic principles on CE (MHD-CE) with the mathematical principles derived from in-depth considerations of magneto-hydrodynamics' theory (patent pending). Preliminary experiments have proven the concepts and the following benefits have been observed: (1) Shorter migration times with improved repeatability and reproducibility; (2) Improved peak profiles, (3) Reduction in diffusion (D) and electric double layer (The double layer thickness or Debye ionic radius(δ); Reduced EOF and improved electrophoretic mobility, (4) Improved current density, (5) Improved efficiency and resolution. (6) The mathematical basis for the phenomenon is appropriate. It is hoped through the work on MHD-CE that an all-encompassing theoretical frame work will be established and MHDE gives the technique the push it has long needed.

Biography

Ali Aboel Dahab is a Researcher and Lecturer at the Pharmaceutical Research Division, King's College London. He is a member of several professional bodies such as Royal society of chemistry and Royal Pharmaceutical Society of Great Britain. He has published many papers in highly reputable journals and has been serving as an Editorial Board Member of some reputed journals. He has worked as a consultant in the area of biopharmaceutical and toxicological analysis at deltaDot Ltd. He has a special interest in pharmacology, toxicological and chiral analysis, biological spectroscopy and the development of analytical techniques.

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