Docket #: S06-244

Directly Detectable Spacers for Indirect Detection of Analytes

This invention enables the high-sensitivity, high-resolution stacking, separation, and fluorescence-based detection of non-fluorescent analytes in any electrophoresis platform. Sample analytes are mixed with a suitable "ladder" of fluorescent isotachophoretic spacer molecules of known mobility and initial concentration. Upon isotachophoretic stacking and separation, spacers stack are directly detectable. Signal decreases (i.e., "dips" in electropherograms) in identifiable locations within the spacer ladder unambiguously identify the presence of analytes and bound their mobility within a narrow, known range. Both analyte mobility and initial concentration can be determined (indirectly but accurately) from spacer signals. The technique can also be applied to other detection modalities such as UV absorption and amperometric detection by identifying spacers with strong signals in such modalities, and using these (absorption and/or amperometric) spacers as an indirect detection of analytes with weak or undetectable signals.

The inventors have experimentally demonstrated the efficacy of the technique and are currently performing a parametric study to quantify its performance.

Applications

- Electrophoretic separation and detection of non-fluorescent species in drug discovery, pharmaceutical research, forensics, and medical diagnostics systems.

- Preconcentration assays for low concentration non-fluorescent species.

Advantages

- Ability to stack, separate and detect non-fluorescent (i.e., untagged) chemical species accurately and with high sensitivity.

- The assay offers: (1) Reduced assay time, (2) More general applicability of fluorescence-based detectors, (3) Reduced assay cost and (4) Species that cannot be labeled can still be detected.

Patents

- Published Application: 20080197019
- Issued: 7,951,278 (USA)

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