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Capillary scale liquid core waveguide based fluorescence detecto chromatography and flow analysis

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ABSTRACT

A versatile, simple, liquid core waveguide (LCW)-based fluorescence detec illary systems. A Teflon AF coated fused silica capillary serves as the LCW. T The light source can be a conventional or high power (HP) light emittir (LD). The source can be coupled to the LCW directly or via an optical fib if a high power (necessarily heat sink mounted) emitter is used. The LCW a slightly larger opaque jacket tube and the LCW terminates just short o sealed with an optical window. The influent liquid thus exits the LCW t through the jacket annulus to exit via an aperture on the jacket tube. The p light efficiently to the photodetector is thus solved by placing the tip of directly on the detector.

For excitation wavelengths of 365 nm (LED/HPLED) and 405 nm (LD), sulfonic acid (sulfoxine)) chelate of aluminum ($\lambda_{em,max}$ ~500 nm) and Cour as the model analyte. For source–detector combinations comprising (a) a U a photodiode, (b) a LD (~5 mW, abstracted from a "Blu-Ray" recorder) ar tube (mPMT), and (c) a high power (210 mW @ 500 mA) surface-mount H were, respectively, 1.7 pmol Al, 3–100 fmol Coumarin 30 (depending on time), and 4 fmol Al. In the last case, the relative standard derivation (R.S.D (n = 10).

1. Introduction

During the present decade, there has been a significant interest in capillary scale separation and detection techniques [1,2]. The capillary format allows for high efficiency rapid separations with low sample and reagent consumption. In favorable cases, it allows for very low pressure, even gravity-flow separations [3–5]. However, the measurement of trace amounts of analytes in ≤1 μL injected sample volumes demand a lot from detection techniques.

Fluorometry is among the most sensitive of analytical techniques. A focused laser beam offers an ideal way to provide small volume intense excitation. Although laser induced fluorescence (LIF) has been most often used in capillary electrophoresis (CE) and reviewed in that context [6,7], it is applicable for non-electrophoretic capillary scale applica commercial LIF instrumentation is st sive to allow wide, especially pedagog sources are intrinsically noisy, degradi predicted on the basis of illumination f the limited number of wavelengths tha conveniently and affordably address r ing of the foot to fit the shoes; a whole and methods have been developed to f The recent availability of violet laser d tal video disc (DVD) players and record optics, does offer, however, inexpensiv orescence detectors with such sources

The attractive performance of liqu for transverse/radial excitation fluores