EuroSciCon

9th Edition of International Conference on

Analytical Chemistry

March 26-28, 2018
Vienna, Austria

Insights in Analytical Electrochemistry, Volume 4
DOI: 10.21767/2470-9867-C1-006

NOVEL MICROFLUIDIC CHEMILUMINESCENCE DETECTOR COUPLED WITH MICRO-SCALE SEPARATION TOWARD HIGHLY SENSITIVE ANALYTICAL TECHNIQUE

Haider Al Lawati
Sultan Qaboos University, Oman

This work encompasses a set of investigations carried out to couple a novel microfluidic (MF) chemiluminescence (CL) device with different concepts of solution mixing as a post-column detection technique for a variety of micro-scale separations. This is because typically the CL reagents are pumped at high flow rates, usually between 2-3 ml min^{-1}. In many cases, operating the systems at lower flow rates resulted in broad peaks. A total flow rate as high as 15 mL min-1 has been used. Here a fully integrated on-chip tris(2,2'-bipyridyl) ruthenium(III)-oxidant CL system was used and compatibility of this system with diverse nature of chromatographic separation was established by exploring reagent chemistry using thirty two analytes from seven different chemical classes. The benefit of enhanced solution mixing in MF chips has been investigated by constructing passive micro-mixers. A spiral design having eight units of flow splitting-and-recombination achieved about 70% of emission compared to three-dimensional teardrop design, which is considered as a gold standard in this study, and used as micro-mixer flow cell for post-column detection. The appraisal of newly developed capillary liquid chromatography MF-CL system was performed using 14 analytes and estimated the analytical figures of merit. The sensitivity of the system was comparable to or superior to those reported using conventional CL detectors used for HPLC and LOD's were between 0.21-2.26 ng mL^{-1}. In some instances such as ofloxacin, far greater sensitivity was obtained. Newly designed detector had no significant effect on post-column band broadening.

haiderl@squ.edu.om