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Abstract:

In this work, the implementation of Bead Injection with multicommutation-based flow systems is reported. A surface renewable chemiluminescence (CL) flow sensor is presented based on the use of CL reaction of luminol with H_2O_2. Dowex 1x8 beads with immobilized luminol onto them were injected in the flow system by means of a six-port rotary valve and were accommodated into a 1 mm optical glass flow cell placed just in front of the rectangular photosensor window with the same size than the cell wall. Automatic computer-controlled manipulation of both reagents and sample solutions was undertaken using a multicommutated flow system which comprises five three-way solenoid valves, a home-made electronic interface and a Java-written software. Once the chemiluminescence signal was registered, sensing beads were automatically discarded out with a six-port rotary valve without needing to reverse or stop the flow. As a proof of concept and example, the enhancement of the chemiluminescence signal produced by Co(II) on the luminol-H_2O_2 reaction in alkaline medium was used for illustrating this implementation determining vitamin B_{12} in pharmaceutical preparations (after mineralization for releasing Co(II)). The analytical performance of the approach was satisfactory, showing a linear dynamic range from 1.7 to 50 μg L^{-1}, a detection limit of 0.5 μg L^{-1}, RSD (%) of 5.3 %, with a sampling frequency of 11 h^{-1}. The proposed approach was applied to different samples and the results were consistent with those obtained with a reference method based on ICP-MS. Based on