# µLC-SERS SYSTEM USING SILVER-QUANTUM DOTS SUBSTRATE FOR THE SEPARATION AND DETERMINATION OF NUCLEIC ACID BASES

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There is a continued interest in the development of highly sensitive, molecular specific detection techniques in miniaturised separation systems such as capillary based liquid chromatography. Surface enhanced Raman scattering (SERS) is a promising detection technique but in order to be truly useful, a reliable analysis system must be achieved. Without such robustness SERS detection will not gain widespread acceptance in a combined system for analytical chemistry.

In the present work, we report the usefulness of an at-line capillary-liquid chromatography—(microdispenser)—surface-enhanced Raman spectroscopy coupling (Figure 1). The novel advances proposed here were the microdispenser used as interface and the type of SERS substrate employed for recording SERS spectra. As SERS-active substrate, a novel colloidal synthesis method where hydroxylamine based silver colloids are formed in the presence of CdSe/ZnS Quantum Dots (QDs) was reported. The QDs act as a co-reducer and form a link separator between the colloid particles establishing more controlled enhancement.

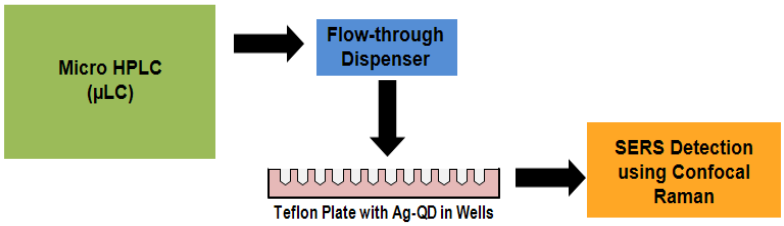


**Figure 1.** Overview of the hyphenated chromatographic separation and SERS detection system.

As an assessment of the effectiveness of the hyphenated µLC SERS system a mixture of purine and pyrimidine bases were separated as shown in Figure 2. The detection limits obtained were in the range 0.5-1 ng (of sample injected into the µLC column).

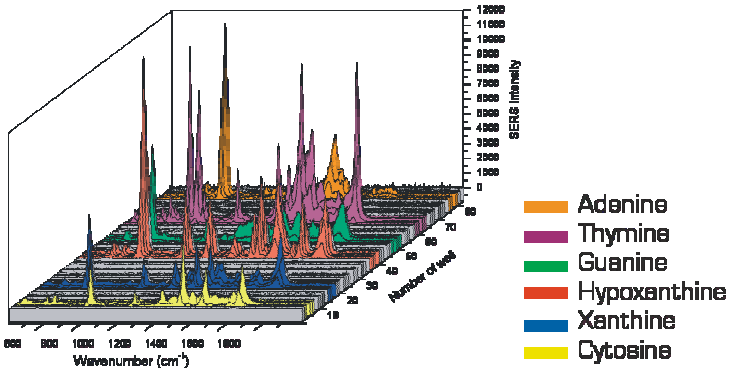


**Figure 2.** SERS spectra of the µLC separated purine and pyrimidine bases shown as a function of well position on the microtiter plate.