

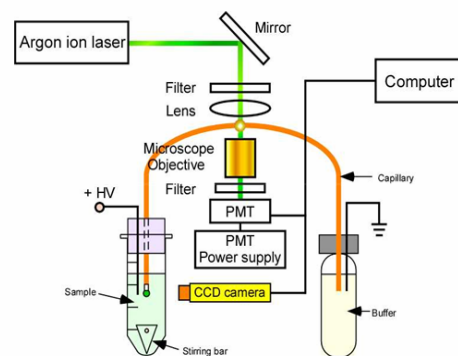
# Large Volume Single Drop Microextraction-Sweeping in Capillary Electrophoresis

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## Abstract

Single drop microextraction (SDME) has been applied as a preconcentration method in capillary electrophoresis. By simple programming of the sample-handling sequences, a single drop of an aqueous acceptor phase coated with a thin layer of an organic phase was formed at the tip of a capillary. Analyte could be preconcentrated by the pH difference between the aqueous acceptor phase and the aqueous donor phase. In this work a dual concentration method combining SDME and sweeping was developed to concentrate 6-carboxyfluorescein and 5-carboxyfluorescein in home-made CE. A tube was added to the end of the capillary in order to increase the volume of the drop in SDME to get large volume sample injection for the sweeping mode. Large volume SDME can broaden the application of SDME and make it easy to be combined with other concentration methods such as sweeping and field-amplified sample stacking (FASS). After SDME the samples were respectively separated by micellar electrokinetic chromatography (MEKC) with a sweeping effect. Sweeping in MEKC is defined as the picking and accumulating of analytes by a pseudostationary phase (micelles) penetrating into the sample zone under an applied voltage. The proposed method provided 40000 fold improvement in sensitivity compared with normal capillary zone electrophoresis mode.

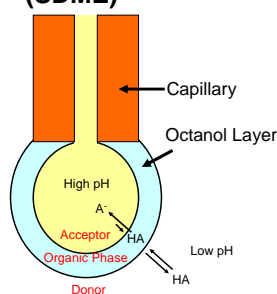
## Experimental



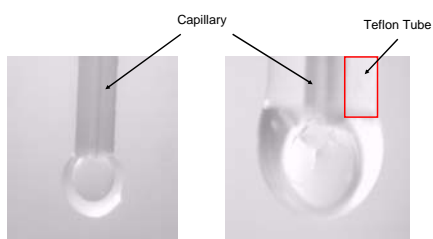
Scheme of LIF Detection Instruments

## Theory

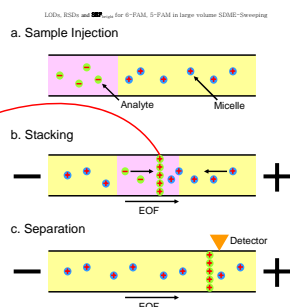
### 1. Single Drop Microextraction (SDME)



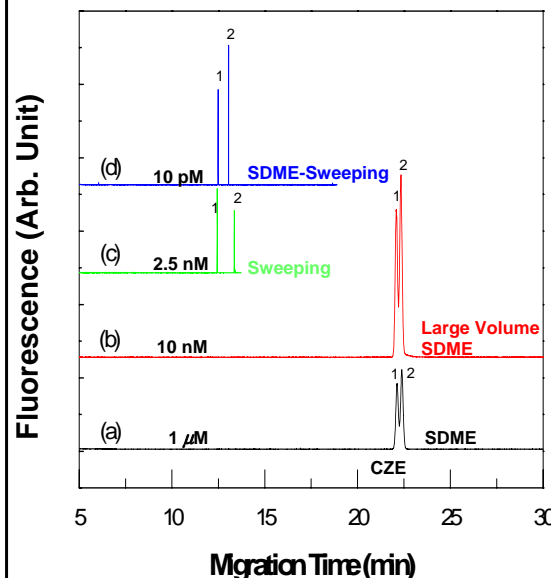
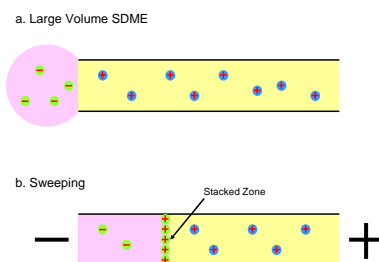
### 2. Large Volume SDME



### 3. Sweeping



### 4. SDME-Sweeping



	6-FAM	5-FAM
LOD (S / N = 3)	0.05 pM	0.05 pM
RSD (n = 3)		
( a ) Migration Time	1.10	0.70
( b ) Peak Height	13.9	17.2
( c ) Peak Area	16.5	12.0
SEF <sub>height</sub>	40000	30000

## Conclusions

- I. Dual stacking method combining SDME and sweeping was introduced.
- II. Teflon Tube was added on the end of the capillary in order to increase the volume of the drop for large volume sample injection.
- III. Compared to SDME or sweeping the SDME-Sweeping method can achieve much higher 30000-fold enhancement.
- IV. Dual stacking method combining SDME and sweeping can clearly lead to further potential uses in the future.