

Fluorescence observations of tryptophan ions generated by ESI and study of electro sprayed droplets

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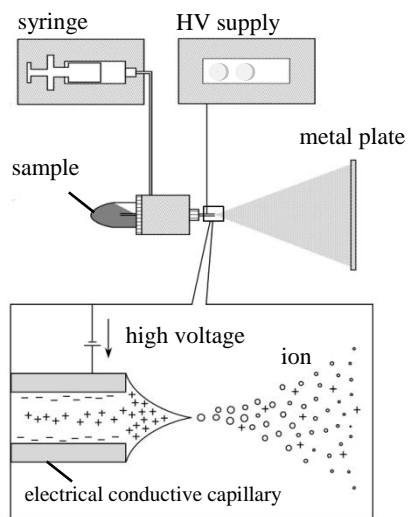


Fig.1 ESI ion generate scheme

【Introduction】 Electrospray ionization (ESI) is the method which generates ions into the gas phase from sample solution (Fig.1). ESI is mainly used in mass spectrometry as an ion source. We can get ions up to the mass of ~ 100 kDa in the gas phase. Our aim of using ESI is as follows: (1) apply ESI to the fluorescence measurement (2) measure UV spectra of gas phase ions or ion cluster. In this study, as the first step, fluorescence from the spray plume just after electro spray emission was observed to understand the mechanism of ESI generation.

【Experiment】 Fluorescence measurement experiments was performed using the fluorescence spectrophotometer

(Hitachi F-2500). Electro spray device was fixed on the movable transitional stage in the spectrometer. Spray was injected toward the metal plate. Spray plume was irradiated by light of Xe lamp, and fluorescence spectra were measured. L-tryptophan was chosen as a sample. The solvent was water:methanol=2:8 (v/v). pH value was adjusted to 11. For comparison, fluorescence spectrum of solution state was measured by the use of 10mm cell.

【Result】 Fig.2 shows the fluorescence spectrum of sample solution (black) and the ESI fluorescence spectra (red) which were measured at various distances. Under this condition, we consider that almost all tryptophan ions are in anion state (Trp^-) because pH value was 11. The numbers in the figure show the distances from the capillary tip to the measurement point. From these spectra, we can see that the peak position of the fluorescence shifts to the longer wavelength with an increase of the distance. We think that this shift is caused by the vaporization of solvent from droplets.

【References】 [1] Hiraoka, J. Mass Spectrom. Soc. Jpn. 2010, vol.58, 139.
[2] Ideue et al., Chem. Phys. Lett. 2001, 337, 79.

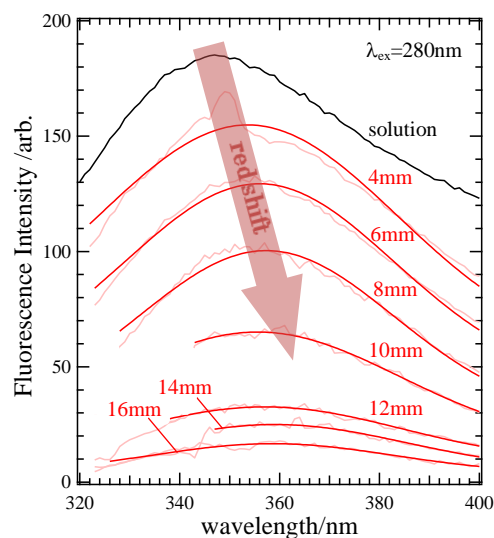


Fig.2 ESI fluorescence spectrum