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Ion and UV photon induced fluorescence from di-peptides

Fast heavy ion and UV photon induced fluorescence from di-peptides of trp-phe, phe-phe, and tyr-leu have been investigated, and the intensities of such photon emissions in the 185 nm – 600 nm wavelength region, and their spectral characteristics were compared with those of their constituent amino acids of tryptophan, phenylalanine, tyrosine, and leusine. Fission fragments from a californium-252 radioactive source has been used to produce ion induced emissions from solid samples of the compounds, and the UV induced emissions of the same compounds in liquid phase were investigated by using a UV/Vis spectrophotometer and a spectrofluorophotometer.

Intensities of the ion induced emissions from di-peptides were found to be smaller than their constituent amino acids except in the case of tyr-leu where the intensity was found to be more than double when compared with the emissions from tyrosine and leusine. Analyses of the time profiles of the ion induced emissions recorded using a home built cf-252 plasma desorption time-of-flight mass spectrometer equipped with a photo multiplier tube revealed that trp-phe, and tyr-leu have single exponential decays having decay times 1.8 ns, and 1.4 ns respectively. However phe-phe showed two decay components with decay times 7 ns, 30 ns. These decay times can be found in the emission components of the constituent amino acids of tryptophan, phenylalanine and tyrosine within error limits. Wavelength analyses of di-peptide emissions also showed that their emissions were similar to the above three amino acids. It indicates that one of the amino acids is dominant in the emissions of di-peptides, and they participate in the emissions as individual amino acids. UV absorption and emission spectra obtained with peptides in liquid form also confirms the above finding.