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Scintillating properties of the amino acids of tryptophan

Fast heavy ion induced emission spectra from amino acid tryptophan in solid phase have been studied to assess its suitability as a scintillator. The characteristics of the spectra have been compared with those of standard scintillators of CsI, CsBr and anthracene. Fission fragments from a californium-252 radioactive source were used to produce photons from solid surfaces of amino acids, and time profiles of the emission of photons were recorded using the time-of-flight mechanism of a home built ^{252}Cf plasma desorption mass spectrometer equipped with a photo multiplier tube.

Investigations showed that the majority of the emission from tryptophan, CsI and CsBr are confined to 300 nm - 400 nm. The wavelength distributions of tryptophan and CsI were also found to be similar. The intensities of emission from the both compounds corresponding to the above wavelength region were 72% and 75% respectively.

Analyses of the fast decaying region of the time profiles revealed that tryptophan has two main decay components with decay times at 2.7 ns and 15.7 ns. The same analyses showed decay times of 0.8 ns, 3.7 ns for CsI, 0.4 ns, 3.8 ns for CsBr, and 2 ns, 7 ns for anthracene. In contrast to anthracene, tryptophan was found to be stable under high vacuum conditions. Usefulness of tryptophan as an ion detector in a plasma desorption time-of-flight mass spectrometer has also been demonstrated.