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Characterization of fast heavy ion induced photon emission from L-amino acids

Emission of photons is one of the energy relaxation processes of electronically exited atoms, molecules or crystal lattices. Upon the impact of fast heavy ions on solid ourfaces, desorption of molecules and their fragments as well as emission of photons can be observed. ^{252} Cf fission fragment induced photons emitted from some organic and inorganic compounds were recorded using a Photomultiplier tube placed in a plasma desorption mass spectrometer (PDMS) system constructed at the Department of Physics, University of Colombo.

In this work, characteristics of fast heavy ion induced photon emission from L- amiono acids numbering 20 were investigated in 185-680 nm wavelength region, and the emission was found to be mainly confined to the UV region. A comparison of the intensities and the wavelength regions of emitted photons from L-amino acids with well known inorganic scintillators namely CsI and CsBr were carried out.

Among the amino acids, the aromatic amino acidsnamely, Tryptophan and Phenylalanine produced highest photon intensities. It has been found for the first time that the photon intensity from Tryptophan is comparable with the order of the photon intensities emitted from CsI and CsBr. Further analysis shows that 99% of the photon emission from CsI and 95% of the same from Tryptophan are within 10 ns time region. It shows that the decay of the fluorescence emitted from both amino acids is found to be a little slower than that from the standard inorganic scintillator, CsI with Tryptophan showing a remarkable closeness to the performance of CsI, as a scintillator.