

Chapter 12

Scintillators & their Properties for Gamma Camera

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In the present day when anyone visits a medical for check-up, doctors immediately refer him/her for diagnosis. Out of many diagnoses medical imaging like X-Ray, CT, PET and MRI are the important ones. This imaging is important because with the help of this doctors can ably see the internal body parts and identify the problem/diseases associated with it. This imaging is not only taking photographs but also the analysis of the photograph to understand about the disease/problem and to prescribe a proper medication. In one line the quality of photograph is important which depends on the gamma camera and the associated Scintillators including the electronics driver. IN the present chapter the details of the variety of Scintillators have been discussed including their properties.

12.1 Introduction & Important parts:

Gamma Camera are very important and still maintains the same structure of the first prototype and its components are:

- a) A **collimator**, placed between the source of the γ rays and the scintillator crystal, which has the function of shielding the crystal from radiations coming from directions not normal to the photodetectors' plane, allowing in this way only limited number of photons to reach the detector having well defined source and path which is important for image reconstruction;
- b) A **scintillator crystal**, which performs a first energy conversion of the incident radiation: a gamma photon, interacting with the crystal lattice, releases all or part of its energy, generating thousands of photons in the visible range;
- c) A **photodetectors matrix**, placed in contact with the opposite surface of the scintillator crystal respect to the collimator, which detects the photons in the visible range and converts them into an electrical signal;