Abstract Submitted
for the NWS08 Meeting of
The American Physical Society

Fast Analysis of Potential Scintillators Using Ion Time Of Flight

BRIAN MILBRATH, YANWEN ZHANG, Pacific Northwest National Laboratory

— The development of scintillators for radiation applications such as national security, medical imaging, and experimental nuclear/particle physics has historically been rather slow, principally due to the developmental time necessary for large crystal growth. Scintillator crystals must achieve dimensions of a few mm before important characterizations, such as gamma ray energy resolution, can be performed. In order to facilitate accelerated discovery, we developed a time of flight (TOF) telescope for use on an ion beam. This allows individual determination of the ion energies prior to impinging the crystal, which may be a very thin prototype material. With such a technique, the scintillator performance in terms of energy resolution, light yield, decay time, and spectrum, can be determined quickly over a broad energy range. Though the analysis is performed using ions rather than the gamma-rays whose detection is the ultimate aim of the materials investigated, we have found useful correlations between the ion and gamma responses of the materials we have investigated (CaF2:Eu, YAP:Ce, BGO, CsI:Tl, and plastic scintillator). The technique appears to be able to rapidly determine whether a scintillator material has promise for further development.

Brian Milbrath
Pacific Northwest National Laboratory

Date submitted: 17 Apr 2008 Electronic form version 1.4