

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Scintillation properties of polycrystalline $\text{La}_x\text{Y}_{1-x}\text{O}_3$ ceramic

SUNIL SAHI, WEI CHEN, RASOOL KENARANGUI, Univ of Texas, Arlington — Scintillators are the material that absorbs the high-energy photons and emits visible photons. Scintillators are commonly used in radiation detector for security, medical imaging, industrial applications and high energy physics research. Two main types of scintillators are inorganic single crystals and organic (plastic or liquid) scintillators. Inorganic single crystals are expensive and difficult to grow in desired shape and size. Also, some efficient inorganic scintillator such as NaI and CsI are not environmentally friendly. But on the other hand, organic scintillators have low density and hence poor energy resolution which limits their use in gamma spectroscopy. Polycrystalline ceramic can be a cost effective alternative to expensive inorganic single crystal scintillators. Here we have fabricated $\text{La}_{0.2}\text{Y}_{1.8}\text{O}_3$ ceramic scintillator and studied their luminescence and scintillation properties. Ceramic scintillators were fabricated by vacuum sintering of $\text{La}_{0.2}\text{Y}_{1.8}\text{O}_3$ nanoparticles at temperature below the melting point. $\text{La}_{0.2}\text{Y}_{1.8}\text{O}_3$ ceramic were characterized structurally using XRD and TEM. Photoluminescence and radioluminescence studies were done using UV and X-ray as an excitation source. We have used gamma isotopes with different energy to study the scintillation properties of $\text{La}_{0.2}\text{Y}_{1.8}\text{O}_3$ scintillator. Preliminary studies of $\text{La}_{0.2}\text{Y}_{1.8}\text{O}_3$ scintillator shows promising result with energy resolution comparable to that of NaI and CsI.

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Date submitted: 14 Nov 2014

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