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Energy Transfer Based Nanocomposite Scintillator for Radiation Detection[1] SOHA ASLAM, SUNIL SAHI, WEI CHEN, LUN MA, RASOOL KENARANGUI, Univ of Texas, Arlington — Scintillators are the materials that emit light upon irradiation with high energy radiation like X-ray or gamma-ray. Inorganic single crystal and organic (plastic and liquid) are the two most used scintillator types. Both of these scintillator kinds have advantages and disadvantages. Inorganic single crystals are expensive and difficult to grow in desire shape and size. Also, single crystal scintillator such as NaI and CsI are very hygroscopic. On the other hand, organic scintillators have low density which limits their applications in gamma spectroscopy. Due to high quantum yield and size dependent emission, nanoparticles have attracted interested in various field of research. Here, we have studies the nanoparticles for radiation detection. We have synthesized nanoparticles of Cerium fluoride (CeF3), Zinc Oxide (ZnO), Cadmium Telluride (CdTe), Copper complex and Zinc sulfide (ZnS). We have used Fluorescence Resonance Energy Transfer (FRET) principle to enhance the luminescence properties of nanocomposite scintillator. Nanocomposites scintillators are structurally characterized with X-ray diffraction (XRD) and Transmission Electron Microscopy (TEM). Optical properties are studied using Photoluminescence, UV-Visible and X-ray. Enhancements in the luminescence are observed under UV and X-ray excitation. Preliminary studies shows nanocomposite scintillators are promising for radiation detection.

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