

ORGANIC SINGLE CRYSTAL GROWN BY SLOW SOLVENT EVAPORATION METHOD FOR RADIATION DETECTION APPLICATION

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Abstract

The ionizing radiation is always present in an environment with high kinetic energy and penetration power which leads to difficulty in detection. This radiation affects the physical, chemical, and biological condition of our nature and must be fully monitored to prevent damage. Various radiations are detected in photo detectors using scintillating materials used in the form of solid, liquid, and gaseous states. Single crystals are grown by various methods of solution and melt growth. Here, solution growth slow solvent evaporation method is aimed to grow the scintillation crystal due to their user free method. Inorganic scintillators give better efficiency but it takes longer detection time, hygroscopic nature. Nowadays, high-quality organic luminescent materials play an important role due to their excellent physical properties such as fast detection, higher atomic number, non-hygroscopic, good pulse shape discrimination, etc. The research work will be based on fast-detecting high-energy radiations such as alpha-beta gamma and neutron. Therefore the grown organic single crystals are subjected to X-ray diffraction, UV-VIS-NIR, Photoluminescence, FTIR, and Raman for functional group analysis, hardness measurement to check the mechanical stability, TG/DTA for thermal stability, and various characterizations for checking the scintillation properties such as maximum emission wavelength, pulse height analysis, decay time, energy, and so on.