

Title: Development of Nanostructured Scintillator Materials
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Abstract: In this research, we propose to develop scintillator materials in the form of large area nonocrystal films and ordered nanorod arrays through controlled sol-gel processing and electrophoretic deposition. Scintillator materials have various important applications including nuclear spectroscopy, dosimetry, neutron detectors for monitoring nuclear weapons or waste, and computed tomography, for example, for X-ray imaging in medical diagnostics. In this study, we will choose cadmium tungstate as a base material for doping and nanostructure development, due to its excellent inherent optical and physical properties. Nanocrystal structure is required to ensure the desired optical transparency, whereas ordered nanorod array structure allows the maximal harvest of resulting luminescence converted from X-rays, γ -rays, and neutrons. In addition, films and nanorod arrays with micrometer thickness permit micrometer or submicrometer spatial resolution.