

The Fabrication of Scintillator Column by Hydraulic Pressure Injection Method

Authors : Chien Chon Chen, Chun Mei Chu, Chuan Ju Wang, Chih Yuan Chen, Ker Jer Huang

Abstract : Cesiumiodide with Na doping (CsI(Na)) solution or melt is easily forming three- dimension dendrites on the free surface. The defects or bobbles form inside the CsI(Na) during the solution or melt solidification. The defects or bobbles can further effect the x-ray path in the CsI(Na) crystal and decrease the scintillation characteristics of CsI(Na). In order to enhance the CsI(Na) scintillated property we made single crystal of CsI(Na) column in the anodic aluminum oxide (AAO) template by hydraulic pressure injection method. It is interesting that when CsI(Na) melt is confined in the small AAO channels, the column grow as stable single column without any dendrites. The high aspect ratio (100~10000) of AAO and nano to sub-micron channel structure which is a suitable template for single of crystal CsI(Na) formation. In this work, a new low-cost approach to fabricate scintillator crystals using anodic aluminum oxide (AAO) rather than Si is reported, which can produce scintillator crystals with a wide range of controllable size to optimize their performance in X-ray detection.

Keywords : cesiumiodide, AAO, scintillator, crystal, X-ray

Conference Title : ICCET 2014 : International Conference on Chemical Engineering and Technology

Conference Location : Tokyo, Japan

Conference Dates : May 29-30, 2014