

PbWO₄

New scintillating crystal -- Lead Tungstate

Lead tungstate (PbWO₄) is a new scintillating crystal discovered in 1990s. It is one of the most dense oxide crystal (8.3g/cm³), and is distinguished by its short radiation length (0.9 cm), small Moliere radius (2.19cm) and strong irradiation hardness. Its scintillation light output peaks between 450-550nm with a fast component decay time in the range from 2-20ns. After irradiation with g-ray, the degradation in the optical transmittance is not large up to 10⁶ rad. PbWO₄ is considered as a promising scintillation material for electromagnetic spectrometer in high energy, nuclear physics experiment as well as nuclear medicine.

Main Properties

| | |
|------------------------------|--------------------------------------|
| Crystal structure | Tetragonal |
| Space group | I 4 ₁ /a |
| Lattice constant (Å) | a = b = 5.416 , c = 12.049 |
| Density (g/cm ³) | 8.28 |
| Radiation length (cm) | 0.92 |
| Molere radius (cm) | 2.19 |
| Decay constant (ns) | 6/30 |
| Peak emission (nm) | 440/530 |
| Light output (%) | 0.5 |
| Index of refraction | 2.16 |
| Melting point (°C) | 1123 |
| Hygroscopicity | No |
| Cleavage | (101) |
| Crystal boule size | 30 mm in diameter x 100 mm in length |

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