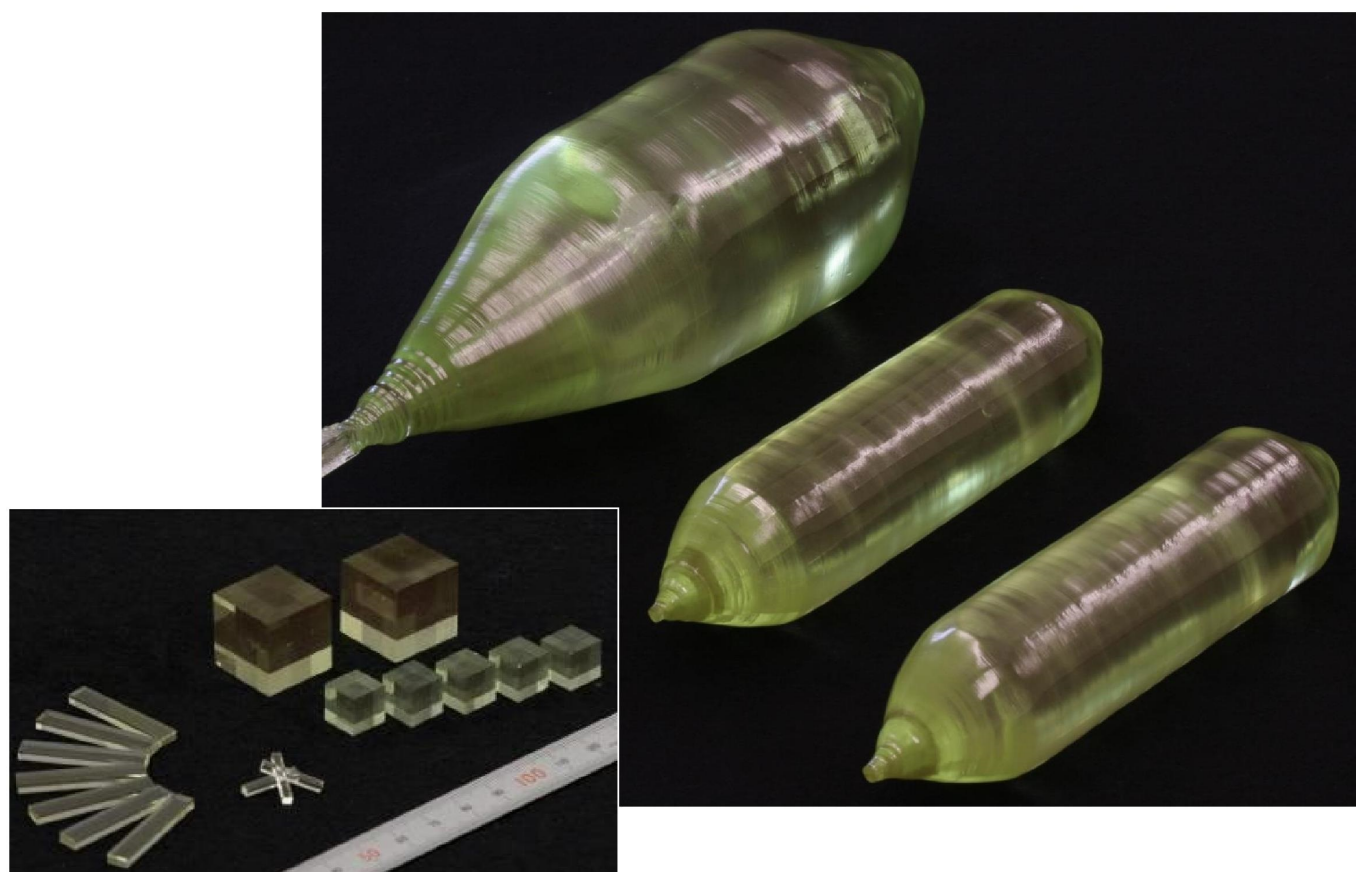


# Pr:LuAG Scintillator Crystal



## Physical and Scintillation Properties

| Scintillators                | Pr:LuAG | Ce:LYSO | BGO   | Ce:LaBr <sub>3</sub> |
|------------------------------|---------|---------|-------|----------------------|
| Density (g/cm <sup>3</sup> ) | 6.7     | 7.1     | 7.1   | 5.1                  |
| Light yield (photon/MeV)     | 20,000  | 34,000  | 8,000 | 75,000               |
| Decay time (ns)              | 20      | 40      | 300   | 30                   |
| Peak emission (nm)           | 310     | 420     | 480   | 360                  |
| Energy resolution (%@662keV) | 4.2     | 10      | 12    | 2.6                  |
| Hygroscopicity               | No      | No      | No    | Yes                  |
| Cleavage                     | No      | No      | No    | No                   |
| Melting point (°C)           | 2,000   | 2,150   | 1,050 | 783                  |

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## Features

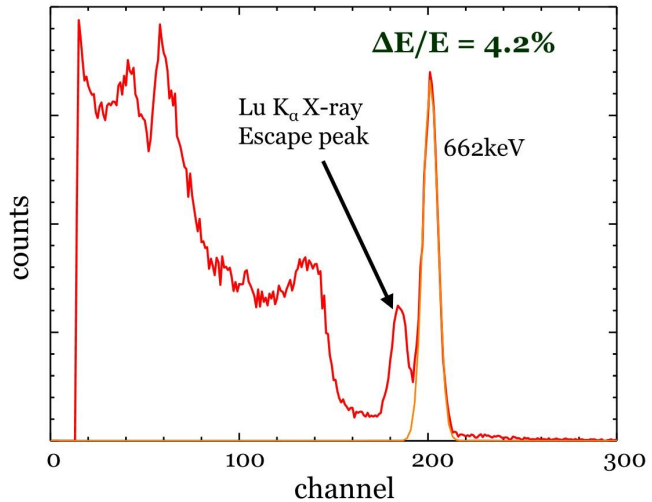
- Decay time: < 25 ns
- Energy resolution: 4.2 %
- Light yield: 20,000 photon/MeV

## Specification

- Diameter : <  $\phi 50$  mm
- Length : < 135 mm

## Application

- PET
- PEM



Energy spectrum of Pr:LuAG excited by  $^{137}\text{Cs}$   
(Pr:LuAG sample size:  $10 \times 10 \times 10 \text{ mm}^3$ )

## Physical Properties of undoped-LuAG

|                                      |                                       |
|--------------------------------------|---------------------------------------|
| Chemical formula                     | $\text{Lu}_3\text{Al}_5\text{O}_{12}$ |
| Structure / Space group              | Cubic / Ia $\bar{3}$ d                |
| Density                              | 6.73 g/cm $^3$                        |
| $Z_{\text{eff}}$                     | 62.9                                  |
| Radiation length $X_0$               | 1.41 cm                               |
| Interaction length                   | 23.3 cm                               |
| Refractive index                     | 2.03 @310 nm                          |
| Hardness (Mohs)                      | 7.5                                   |
| Fracture toughness                   | 1.1 MPa m $^{1/2}$                    |
| Cleavage plane / H $_2$ O solubility | No / No                               |
| Melting point                        | 2,000 $^{\circ}\text{C}$              |
| Thermal expansion @RT                | $8.8 \times 10^{-6} \text{ K}^{-1}$   |
| Thermal conductivity @RT             | 31 W/mK                               |

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