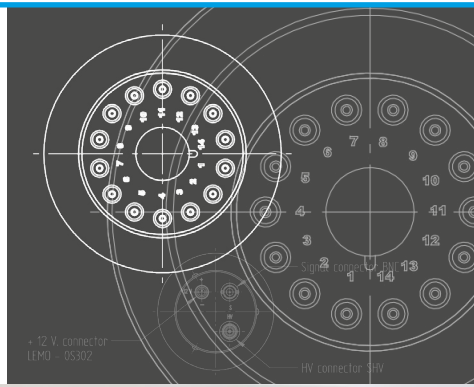
Cesium Lanthanum Lithium BromoChloride



CLLBC

Radiation Detectors

Introducing CLLBC

Cesium Lanthanum Lithium BromoChloride (CLLBC, $Cs_2LiLaBr_{4\cdot 8}Cl_{1\cdot 2}$:Ce)

Dual mode CLLBC crystal offers an ideal solution for applications that require high-resolution gamma spectroscopy and Neutron detection in one scintillator. CLLBC scintillators feature energy resolution of 3% FWHM at 662 keV and excellent gamma/neutron separation using Pulse Shape Discrimination.

Cesium Lanthanum Lithium BromoChloride (CLLBC, $Cs_2LiLaBr_{4\cdot 8}Cl_{1\cdot 2}$:Ce) or CLLBC scintillators have similar properties to the well-known LaBr3:Ce material. Typical energy resolution for CLLBC scintillators is 3% FWHM for 662 keV. However, due to the presence of Lithium, CLLBC detectors can be used for Neutron detection in addition to high-resolution gamma spectroscopy. The material features a sharp Neutron peak between 3.1 and 3.2 MeV.

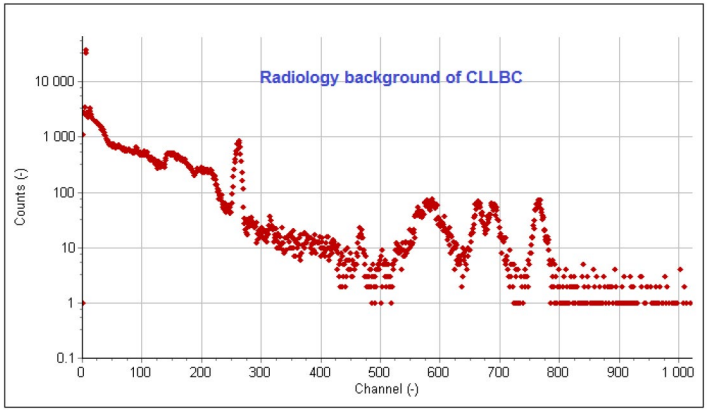
In addition, CLLBC offers excellent neutron/gamma discrimination using PSD.

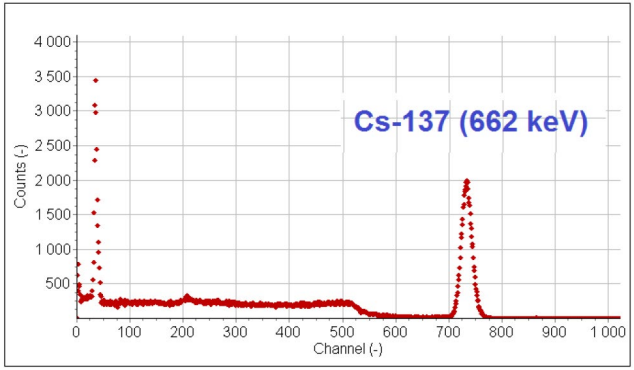
Properties

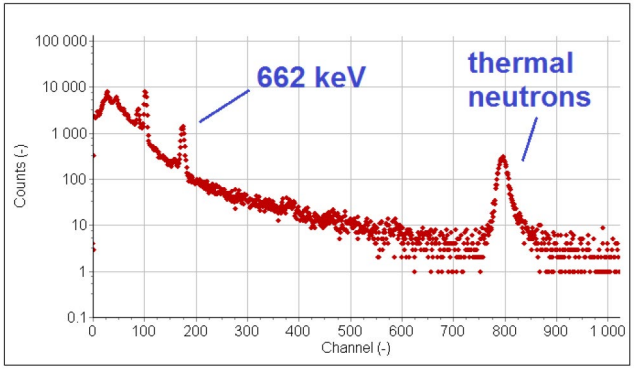
Density: 4.08 g / cc
Maximum emission: 420 nm
Decay time (typical): 120 ns, 500 ns (average approx 150 ns)
Refractive index: 1.90
Photoelectron yield compared to NaI(Tl): 70 % (1.5 µs shaping time) – 84 % (12 µs shaping time)
Photons/MeV: Approx. 45.000/MeV
Hygrosopic: YES
6-Lithium enrichment: 95 %
Energy resolution @ 662 keV: < 3.5 % FWHM (38×38 mm)

Uses

- high-resolution gamma spectroscopy
- Neutron detection
- Pulse Shape Discrimination







Resolution Comparison: CLLBC-CeBr3-NaI(Tl)

Energy (keV)	Typical resolution CLLBC	Typical resolution CeBr3	Typical resolution NaI(Tl)
30 (129-I)	15 %	20 %	18 %
59.5 (241-Am)	10 %	13 %	10 %
122 (57-Co)	6.4%	8 %	8.5 %
662 (137-Cs)	3.2 %	4 %	7 %
1332 (60-Co)	2.3 %	3 %	5.5 %
2600 keV (Th-228)	1.8 %	2.5 %	4.0 %