



NaI(Tl)

NaI(Tl) crystals have the high light output scintillators and a convenient emission range coinciding with a maximum efficiency of photomultipliers with bialkali photocatodes. Large-size NaI(Tl) crystals can be produced at a low cost.

CsI(Na)

CsI(Na) is a good alternative for NaI(Tl) in many standard applications because it has a high light output (85% of that of NaI(Tl)), the emission in a blue spectral region coinciding with the maximum sensitivity of the most popular PMT with bialkali photocatodes, and hygroscopicity substantially lower than that of NaI(Tl).

CsI(Tl)

Since the maximum of emission spectrum is at 550 nm, photodiodes can be used to detect the emission. It is possible to reduce significantly the size of the detection system, to do without a high-voltage power supply, and to use the detection system in magnetic fields.

CsI(CO₃)

We offer a new scintillation material, CsI(CO₃). The light output in gamma-excitation is 60% that of NaI(Tl). The decay time varies from 1.4 to 3.4 μs depending on the dopant concentration. These characteristics allow CsI(CO₃) to be used in combination with other scintillators in phoswich detectors. CsI(CO₃) has an afterglow of 0.05% after 5 ms.

CsI pure

The decay time is ~10 ns. Undoped CsI can be effectively used for experiments in medium- and high-energy physics.

Selector guide for alkali halide scintillators.

Material	Important properties	Applications comments
NaI(Tl)	High light output, good energy resolution	General scintillation counting, health physics, environmental monitoring, high temperature use
CsI(Tl)	Non-hygroscopic, rugged, long wavelength emission	Particle- & high energy physics, general detection,
CsI(Na)	High light output, rugged	Geophysical
CsI(pure)	Fast	High energy physics
CsI(CO ₃)	Medium decay time, low afterglow	gamma-detection,

ALKALI-HALIDE SCINTILLATORS



PROPERTIES OF ALKALI HALIDE SCINTILLATORS

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	NaI(Tl)	CsI(Na)	CsI(Tl)	CsI (undoped)	CsI(CO₂)	⁶LiI(Eu)
Density [g/cm³]	3.67	4.51	4.51	4.51	4.51	4.08
Cleavage plane	<100>	none	none	none	none	<100>
Hardness (Mho)	2	2	2	2	2	2
Hygroscopic	yes	yes	slightly	slightly	yes	very
Emission peak [nm]	415	420	550	310	405	470
Refractive index at emission maximum	1.85	1.84	1.79	1.95	1.84	1.96
Light output [% of NaI(Tl)] (for gamma-rays)	100	85	45	5-6	60	30-35
Primary decay time [μs]	0.23	0.63	1	0.01	2	1.4
Afterglow (after 6 ms) [%]	0.3-5	0.5-5	0.1		0.06	
Lower wavelength cutoff [nm]	300	300	320	260	300	425