Alpha Spectra, Inc. Data Sheet
Materials Data Sheet
Grand Junction, Colorado

Alpha Spectra, Inc. offers many different scintillation detector materials for nuclear radiation detection and measurements. These materials are available in custom sizes and shapes for numerous applications.

These materials are available in several detector configurations including: open face, thin, thin integral, thin window, demountable, side well, end well, environmental, ruggedized, annular types, ultra-low background and more. ASI has extensive capability for building custom designs. Be sure to review our Special Detector Designs data sheet.

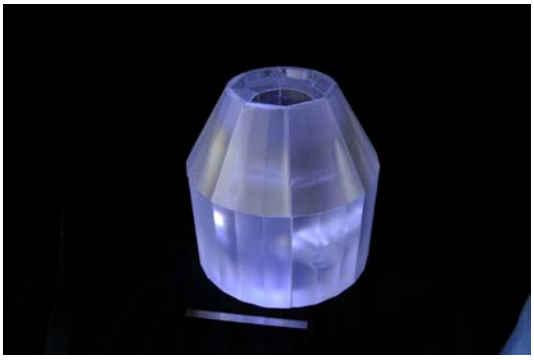

Figure 1. Special BGO Compton Suppression Detector – Bare Crystal. (ASI photo)

Please call us to discuss your scintillation detector requirements.

Scintillator General Properties and Typical Applications

Scintillator Material	Advantages	Examples of Applications
NaI(Tl)[1]	Good light yield, best cost	General counting, x-ray counting, dose calibration, commercial gauges, health physics, Compton Suppression, medical imaging, geophysical exploration, homeland security, dark matter experiments
CsI(Na)[1]	Good light yield, rugged	Geophysical exploration, general counting
CsI(Tl)[1]	Non-hygroscopic, rugged	Photodiodes, high energy physics, phoswiches
CsI(pure)[1]	Fast light output	Calorimetry
BGO	High density	Geophysical exploration, general counting, Compton Suppression, geophysical exploration
CaF_2(Eu)	Non-hygroscopic, good light yield	β detectors, special α – β phoswiches
$CeBr_3$	Very good light yield, fast light output	Geophysical exploration, hand held meters
$LaCl_3$(Ce)	Very good light yield, fast light output	Geophysical exploration, hand held meters
^{6}LiI(Eu)	Good light yield, good neutron cross section	Thermal neutron detection, gamma spectroscopy
^{6}Li-glass	Good neutron cross section, non-hygroscopic	Thermal neutron detection
$CdWO_4$	High density, low afterglow	Photodiodes, high count rate x-ray scanners
BaF_2	Very fast light output	Fast timing, nuclear physics research
LYSO	High density, fast light output	General counting, commercial gauges
SrI_2(Eu)[2]	Very Good light yield	Hand held meters
Plastic	Fast light output, low density, good light yield	Screening monitors, particle detection, β monitors
Liquid	Fast light output, low density, good light yield	Nuclear physics research

[1]Materials currently grown at ASI. [2]Materials in development at ASI.

Properties of Scintillation Detector Materials

Scintillator Material	Density [g/cm^3]	Hygroscopic	Emission Wavelength [Max.]	Light Yield[3] [NaI(Tl)=100] [%]	Principle Decay Time [μsec][4]	Index of Refraction[5] n
NaI(Tl)[1]	3.67	Yes	415	100	0.23	1.85
CsI(Na)[1]	4.51	Slightly	420	85	0.63	1.84
CsI(Tl)[1]	4.51	No	550	45[6]	0.68	1.80
CsI(pure)[1]	4.51	No	315	4-6	0.016	1.95
BGO	7.133	No	480	20	0.3	2.15
CaF_2(Eu)	3.18	No	435	50	0.9	1.44
$CeBr_3$	5.07	Yes	380	155	0.019	2.09
$LaCl_3$(Ce)	3.79	Yes	330/352	120	0.070/0.0003	1.81
[6]LiI(Eu)	4.08	Yes	470	35	1.4	1.96
[6]Li-glass	2.6	No	390-430	4-6	0.060	1.56
$CdWO_4$	7.90	No	480	30-50	20	2.20
BaF_2	4.89	Yes	220/320	3/16	0.62/0.0006	1.47
LYSO	7.3	No	397	75	.00041	1.82
SrI_2(Eu)[2]	4.59	Yes	~430	~210	~0.003	1.85
Plastics	1.02	No	370	25-30	0.00141	1.58
Liquids	1.00	No	425	35-45	3.2	1.505

[1] Materials currently grown at ASI.
[2] Materials currently in development at ASI.
[3]Light Yield: when coupled to a PMT with a Bialkali photocathode at room temperature.
[4]At room temperature.
[5]At the maximun wavelenght of emission.
[6]Best suited to be used with a photodiode due to wavelength mismatch with standard PMT.

Also please note that ASI offers different radiopurity grades of material. Our cleanest radiopurity NaI (Tl) material Premium WIMPScint-III is being used in Dark Matter experiments. Please contact us for more details.

For more information regarding material properties please contact Alpha Spectra, Inc.. Our design team will help you design a custom detector configuration to meet the needs of your measurement application.

Alpha Spectra, Inc.
SCINTILLATION DETECTORS
800-231-2545 . 970-243-4477 . 970-244-6947FAX
715 Arrowest Ct. Grand Junction, CO 81505
www.alphaspectra.com