

High flashpoint EJ-309 liquid scintillation detectors

High flashpoint EJ-309 liquid scintillator is an alternative to the commonly used EJ-301 (=NE213). EJ-309 has a flashpoint of 144°C and is not listed as dangerous goods material. It's Pulse Shape Discrimination (PSD) properties are just slightly inferior to EJ-301.

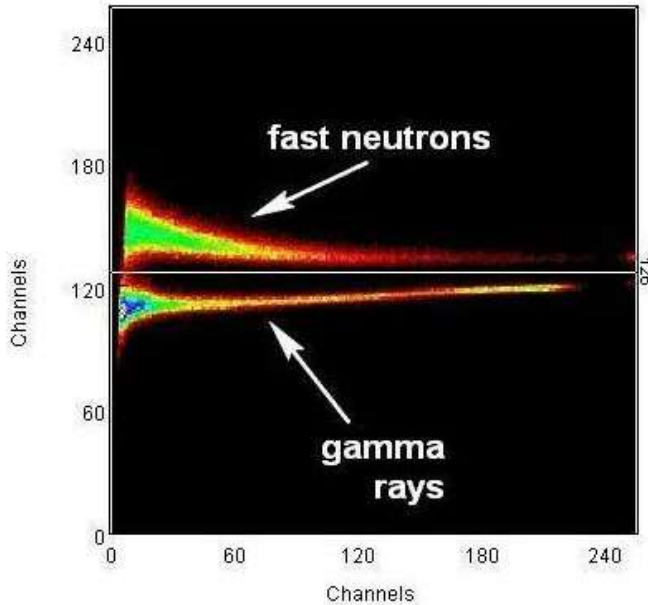
To increase the neutron sensitivity, EJ-309 can be doped with Boron up to a weight percent of 5% of natural boron. This material is called EJ309:B5.

EJ-309 can be encapsulated in a variety of geometries and can be read out with suitable PMT's to obtain the optimum timing and neutron gamma separation via PSD.

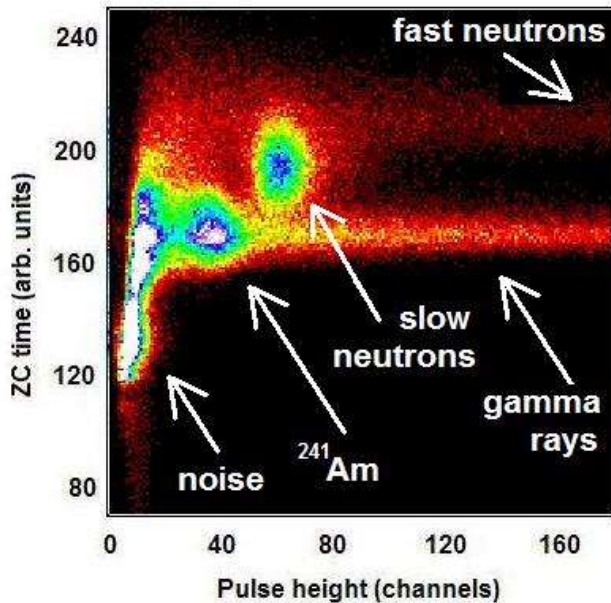
Properties	EJ-309	EJ-309:B5
Light output (rel. to Anthracene)	75%	52%
Photon yield / MeV electrons	11.500	approx. 8000
Maximum of emission wavelength	424 nm	424 nm
Density (15°C)	0,964 g/cc	0,963 g/cc
H:C ratio	1,25	1,28
No. C atoms per cc	$4,37 \cdot 10^{22}$	$4,13 \cdot 10^{22}$
No. H atoms per cc	$5,46 \cdot 10^{22}$	$5,34 \cdot 10^{22}$
No. electrons per cc	$3,17 \cdot 10^{23}$	$3,16 \cdot 10^{23}$
No of ¹⁰ B atoms per cc	----	$5,34 \cdot 10^{23}$
Flash point	144°C	144°C
Decay time short component	Approx. 3,5 ns	Approx. 3,5 ns
Refractive index	1,57	1,57
Light attenuation coefficient	> 1 m	>1 m



Pu-Be low gain



2-dimensional scatterplot showing neutron/gamma separation in EJ-309



2-dimensional scatterplot showing neutron/gamma/X-ray separation in EJ-309:B5. The Boron related neutron capture peak is located at a significant higher gamma equivalent energy (100 keV) than in boron doped EJ-301 (60 keV)