YAG(Ce)
Yttrium Aluminum Garnet Scintillation Material

YAG(Ce) — Yttrium Aluminum Garnet doped with Cerium [chemical formula $Y_3Al_5O_{12}(Ce)$] — is a non-hygroscopic, chemically inert inorganic scintillator. The wavelength of the maximum emission at 550nm is well matched to CCD sensitivity. YAG(Ce) is a reasonably fast scintillator with a relative light yield of 21% of NaI(Tl).

This material exhibits specific properties that make it an interesting candidate for electron microscopy applications instead of the phosphors commonly used:

- High electron conversion efficiency.
- Good resolution. YAG(Ce) is clear, not diffuse like phosphor screens.
- YAG(Ce)'s light yield increases linearly with the total energy of the electron beam, whereas the response of phosphors dramatically decreases.
- YAG(Ce) is mechanically rugged and long lasting.
- Good thermal conductivity ($13 Wm^{-1}K^{-1}$) prevents local heating from a concentrated electron beam.
- The mechanical ruggedness and good thermal conductivity of YAG(Ce) provide a hardness to electron beams, and thus a long lifetime is expected.
- Vacuum compatibility.

Other possible applications include beta and X-ray counting, and electron and X-ray imaging screens. Its mechanical properties enable screens down to 0.030 mm thick.

Properties	
Density [g/cm^3]	4.55
Hardness (Mho)	8.5
Hygroscopic	No
Wavelength of emission max [nm]	550
Refractive index @ emission max.	1.82
Decay time [ns]	70
Relative light output	15
Light output, photons per keV	8

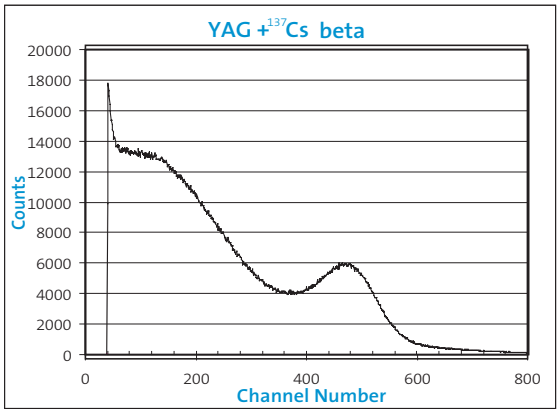

Figure 1. ^{137}Cs conversion electron spectrum

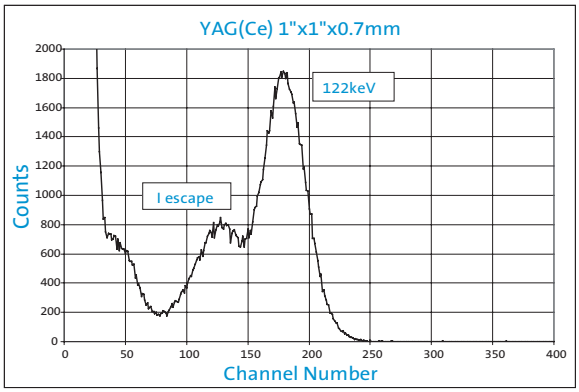

Figure 2. ^{57}Co spectrum

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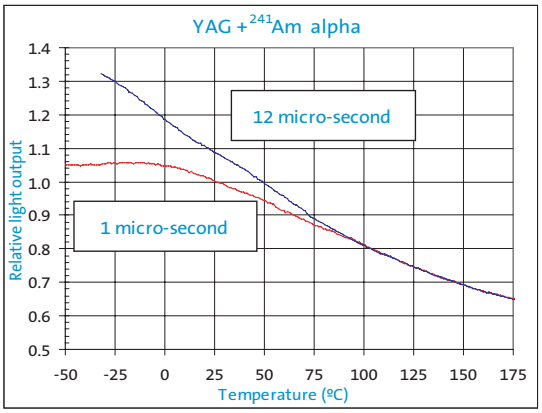

Figure 3. Temperature Response of YAG (Data compiled by C. M. Rozsa)

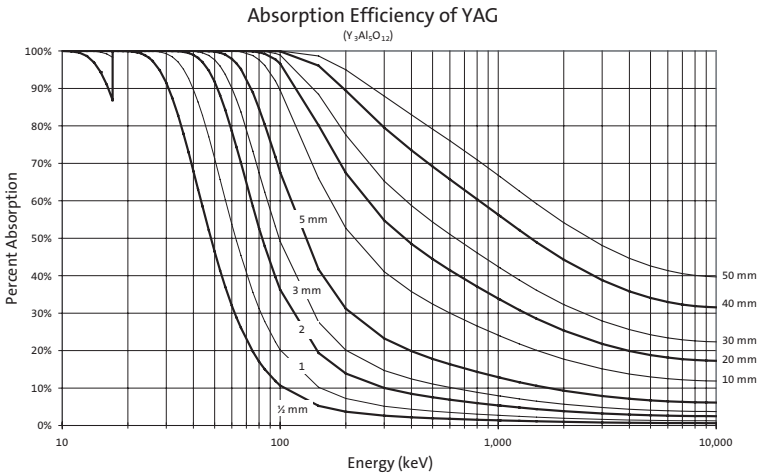

Figure 4. Gamma and X-ray absorption efficiency for various thicknesses of YAG. Data compiled by C. M. Rozsa (presented in Saint-Gobain Crystals brochure "Efficiency for Selected Scintillators.")

Property	YaG(Ce)	NaI(Tl)	BGO
Density (g/cm³)	4.55	3.637	7.13
Decay time (ns	70	250	300
Wavelength of emission max(nm)	550	415	480
Average temperature coefficient from 25 to 50°C (%/°C)	-0.24@1µs-0.34@12µs	-0.3	1.2
Light output, photons per keV	8	38	8.5

Table comparing principal properties of YAG, NaI and BGO

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www.crystals.saint-gobain.com

Manufacturer reserves the right to alter specifications.

(06-18)