

Near-IR Capability of the FLUOROLOG®

Introduction

The SPEX® FLUOROLOG® spectrofluorometer, with its modular flexibility, gives choice of gratings, detectors, and other accessories. The standard FLUOROLOG® configuration has an R928P photomultiplier tube in an L-format, and is sensitive out to ~ 850 nm. For near-IR fluorescence measurements, an optional solid-state detector (DSS-IGA020L) can be substituted for the R928P, or mounted on the T-side of the sample compartment. The DSS-IGA020L is an InGaAs detector, with sensitivity to ~1700 nm. This *Application Note* demonstrates the ability of the FLUOROLOG® to detect fluorescence emissions in the near-IR.

Experiment

A liquid-N₂-cooled DSS-IGA020L InGaAs detector was used on the T-side of a FLUOROLOG®-321 (single emission monochromator). The gratings' groove density was

600 grooves mm⁻¹, blazed to 1.0 μm. Samples were Nd-doped phosphate laser glass, and Er₂O₃ powder. The integration time was 0.2 s. Scanning parameters are in Table 1 (see back).

Results

Figure 1 (Nd-doped glass, below) shows clear peaks in the red and near-IR regions. Figure 2 (on back) shows spectra for Er₂O₃ powder in a Model 1933 solid-sample holder. A 780-nm cut-off filter was used in the emission spectrum. Obvious near-IR bands are visible at ~1000 nm and ~1500 nm.

Conclusion

The FLUOROLOG® is a sensitive instrument for all fluorescence applications in the liquid or solid state. With its ability to add detectors easily, the full range of fluorescence, from UV to near-IR, is available for all your fluorescence needs.

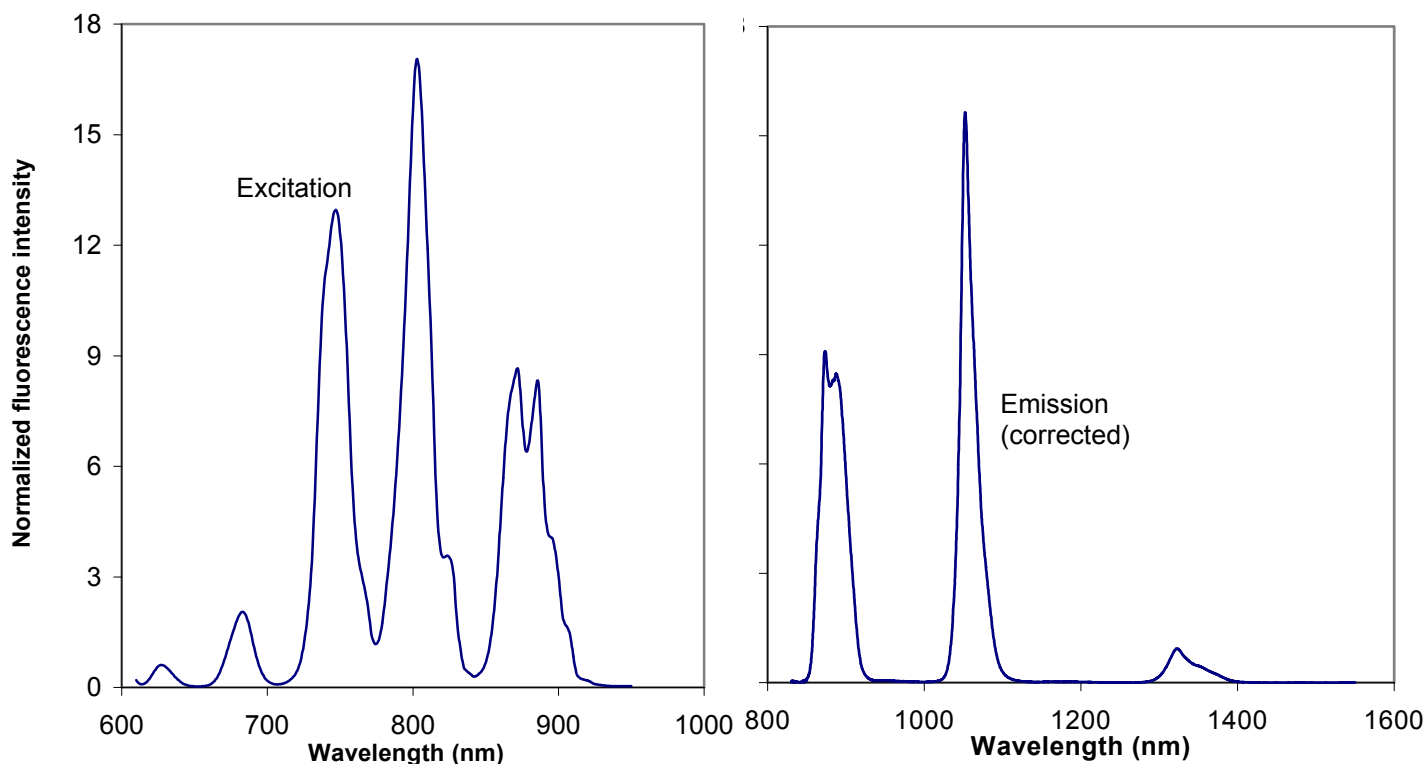


Figure 1. Normalized fluorescence spectra from Nd-doped phosphate laser glass. On the left is the excitation spectrum; on the right is the corrected emission spectrum.

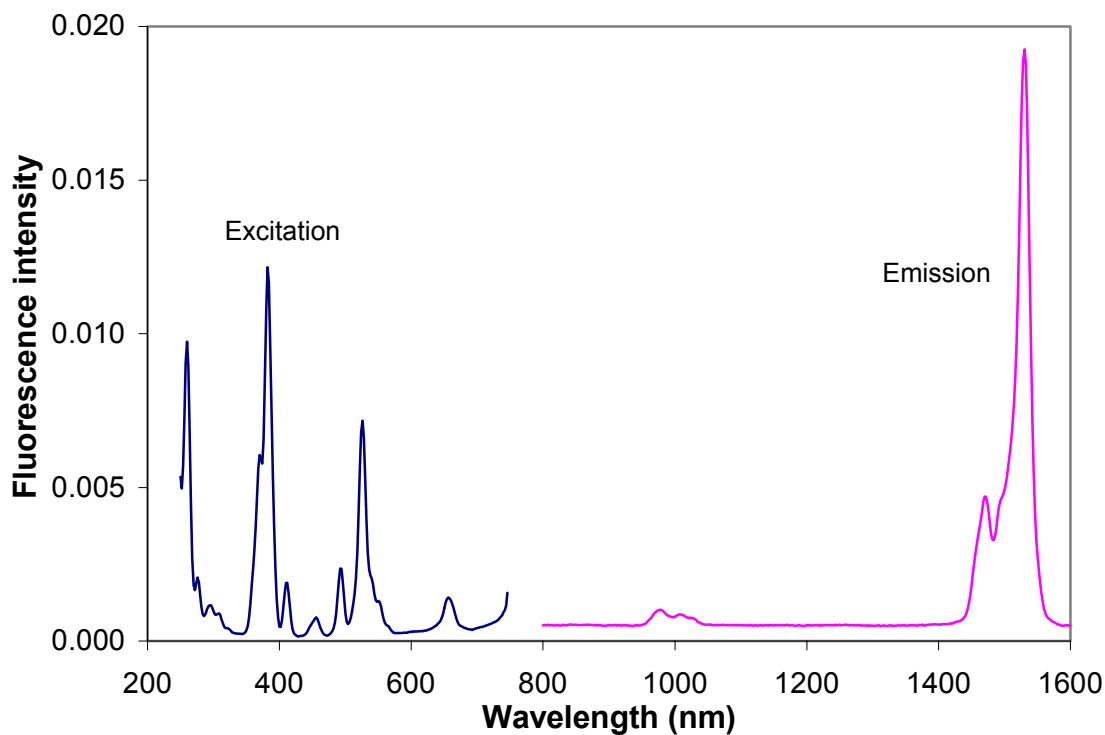


Figure 2. Fluorescence spectra from Er_2O_3 powder.

Sample	Parameter	Excitation spectrum	Emission spectrum
Nd-doped phosphate laser glass	Excitation mono. bandpass (nm)	8	8
	Excitation mono. position (nm)	620–950	800
	Emission mono. bandpass (nm)	1	4
	Emission mono. position (nm)	1050	825–1400
	Increment (nm)	0.5	0.25
	Integration time (s)	0.2	0.2
Er_2O_3 , (Aldrich, 99.99%)	Excitation mono. bandpass (nm)	14	14
	Excitation mono. position (nm)	250–750	525
	Emission mono. bandpass (nm)	14	14
	Emission mono. position (nm)	1530	800–1600
	Increment (nm)	2	2
	Integration time (s)	0.2	0.2

Table 1. Scan parameters for the samples.

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