



Near-IR Capability of the Fluorolog[®] Spectrofluorometer

Introduction

The HORIBA Jobin Yvon 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, various optional solid-state detectors can be substituted for the R928P, or mounted on the T-side of the sample compartment. For example, the TGA is an InGaAs detector with sensitivity out to ~2300 nm. This Technical Note demonstrates the ability of the Fluorolog[®] to detect fluorescence emissions in the near-IR.

Experimental method

A liquid-N₂-cooled DSS-IGA020L InGaAs detector was used on the T-side of a Fluorolog[®]-3-21 (double-grating excitation monochromator, and 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 (Aldrich, 99.99%). The integration time was 0.2 s. Scan parameters are in Table 1 (see back).

Results

Fig. 1 (below), Nd-doped glass, shows clear peaks in the red and near-IR regions. Fig. 2 (see back) shows spectra for Er₂O₃ powder in a 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.

Conclusions

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.

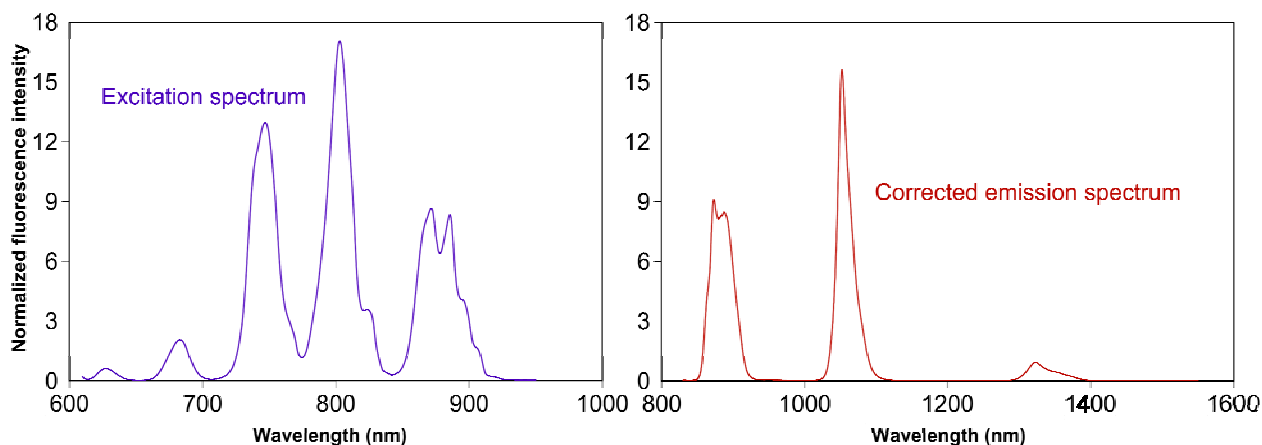


Fig. 1. Normalized fluorescence spectra from Nd-doped phosphate laser glass. On the left is the excitation spectrum; on the right is the corrected emission spectrum.

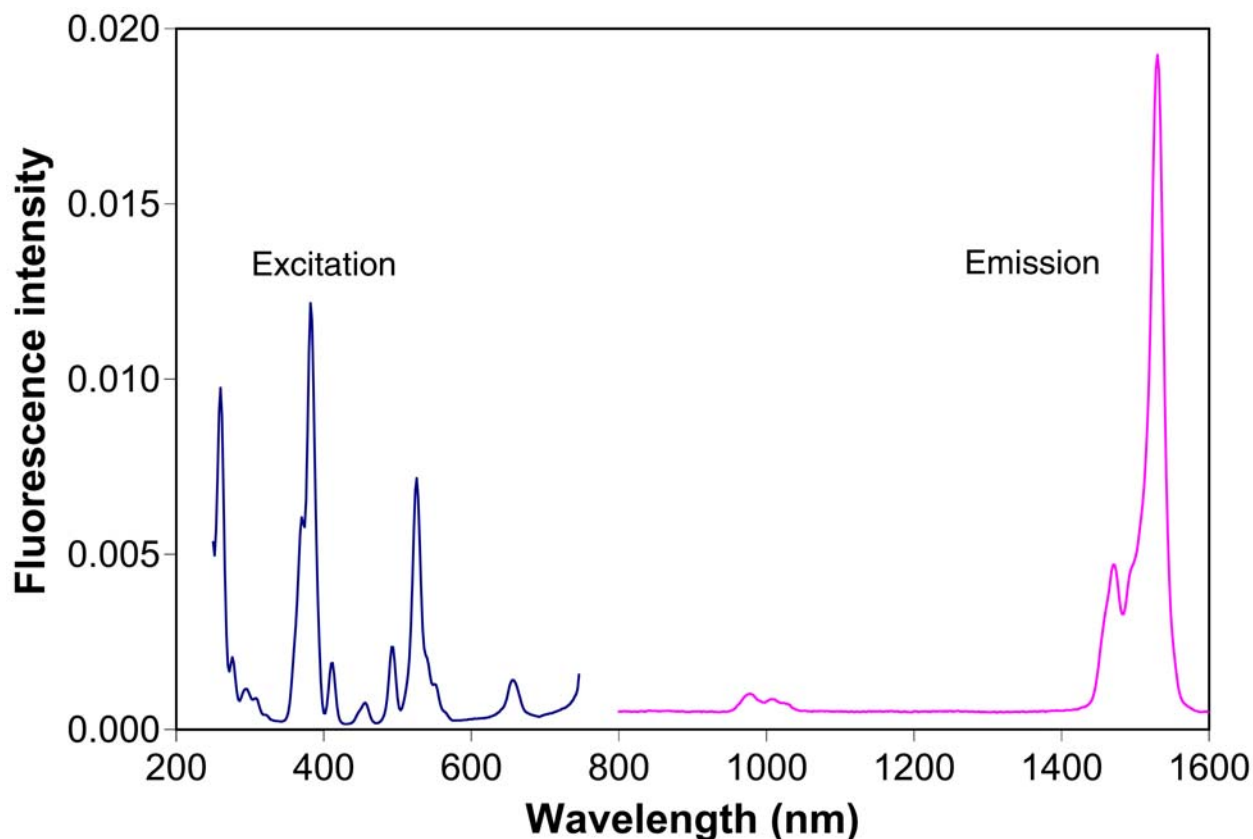


Fig. 2. Fluorescence spectra from Er_2O_3 powder.

Sample	Parameter	Excitation spectrum	Emission spectrum
Nd-doped phosphate laser glass	Excitation monochromator bandpass (nm)	8	8
	Excitation monochromator position (nm)	620–950	800
	Emission monochromator bandpass (nm)	1	4
	Emission monochromator 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 monochromator bandpass (nm)	14	14
	Excitation monochromator position (nm)	250–750	525
	Emission monochromator bandpass (nm)	14	14
	Emission monochromator 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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