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Wednesday, November 3, 2021

# PHOTONICS spectra®

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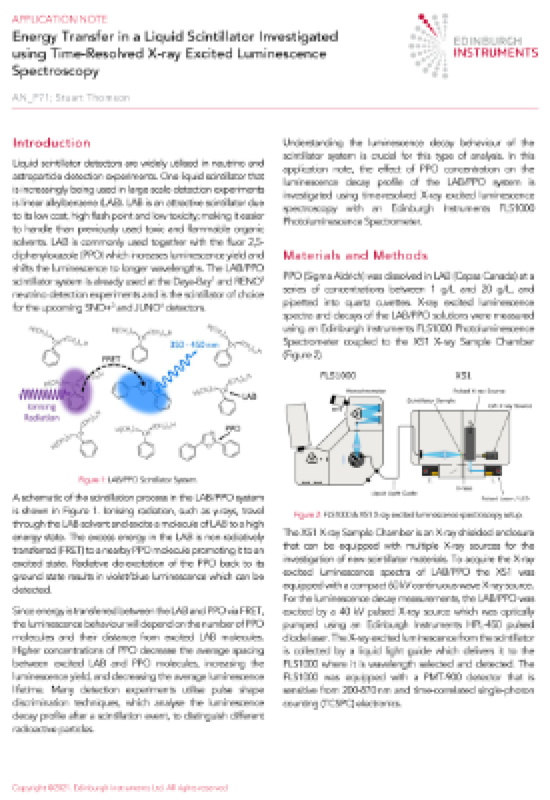
APPLICATION NOTE

Energy Transfer in a Liquid Scintillator Investigated using Time-Resolved X-ray Excited Luminescence Spectroscopy

AN_P71; Stuart Thomson

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Introduction

Liquid scintillator detectors are widely utilised in neutrino and astroparticle detection experiments. One liquid scintillator that is increasingly being used in large scale detection experiments is linear alkylbenzene (LAB). LAB is an attractive scintillator due to its low cost, high flash point and low toxicity; making it easier to handle than previously used toxic and flammable organic solvents.

Understanding the luminescence decay behaviour of the scintillator system is crucial for this type of analysis. In this application note, the effect of PPO concentration on the luminescence decay profile of the LAB/PPO system is investigated using time-resolved X-ray excited luminescence spectroscopy with an Edinburgh Instruments FLS1000 Photoluminescence Spectrometer.

Materials and Methods

Figure 1 LAB/PPO Scintillator System

Figure 2 FLS1000 & XS1 X-ray excited luminescence spectroscopy setup.

# X-ray Excited Luminescence Lifetime of Scintillators

Liquid scintillator detectors are widely utilised in neutrino and astroparticle detection experiments. One that is increasingly being used in large scale detection experiments is linear alkylbenzene (LAB). LAB is an attractive scintillator due to its low cost, high flash point, and low toxicity; making it easier to handle than previously used toxic and flammable organic solvents. In this Application Note, the spectral and time-resolved X-ray excited luminescence of a liquid scintillator is studied using a Photoluminescence Spectrometer and X-Ray sample chamber.

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