

Department of Chemistry

Graduate Student Seminar – Summer 2020

Low-temperature time-resolved phosphorescence excitation emission matrices for the analysis of phenanthro-thiophenes in chromatographic fractions of complex environmental extracts

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The present study investigates the analytical potential of low-temperature photoluminescence spectroscopy for the analysis of seven phenanthrothiophenes with molecular mass 234 g mol^{-1} . The studied PASHs include Phenanthro [1,2-*b*]thiophene, Phenanthro [2,1-*b*]thiophene, Phenanthro [2,3-*b*]thiophene, Phenanthro [3,2-*b*]thiophene, Phenanthro [3,4-*b*]thiophene, Phenanthro [4,3-*b*]thiophene and Phenanthro [9,10-*b*]thiophene. Excitation and emission spectra recorded from *n*-alkane solutions at room temperature, 77 K and 4.2 K show phosphorescence emission from all the studied isomers at cryogenic temperatures. The analytical figures of merit obtained under steady state (fluorescence) and time-resolved (phosphorescence) conditions provide limits of detection at the parts-per-billion (ng mL^{-1}) concentration levels. Processing 77 K and 4.2 K phosphorescence data with parallel factor analysis showed to be a robust approach to the determination of phenanthro-thiophenes in complex fluorophore mixtures.