Summary

The papers in this volume follow the order of presentation in the original symposium and cover a broad range of topics.

Baeyens et al. discussed the chromatographic determination of important naturally occurring thiols and thiol-containing drugs using fluorogenic reagents for pre- and post-column derivatization in high performance liquid chromatography (HPLC). They indicated that HPLC combined with fluorescence detection has been a very suitable technique for the specific and sensitive determination of thiols down to the picomole to nanogram range. A number of promising reagents were described together with their advantages and limitations.

Woolf and Grayeski also described a biochemically important method for the determination of proteins with hydrophobic sites A fluorophore is bound to the hydrophobic portion of the protein and excited with an aqueous peroxyoxalate chemiluminescence reaction. The resulting chemiluminescence signal is enhanced by the hydrophobic environment of the protein Low ng/mL concentrations of human albumin have been detected by this method

Warner et al. discussed approaches to optimization of several components of a conventional fluorometer using innovative approaches involving stabilization of a xenon arc lamp, improvements of sample chemistry by techniques such as sample deoxygenation and cyclodextrin complexation, increased detector sensitivity and especially development of data reduction strategies for complex data using chemometric approaches Specific examples include the following: (1) investigation of the influence of alkyl alcohols on enhancing fluorescence in ternary cyclodextrin-alcohol-pyrene systems with the greatest enhancement being found for t-butanol, (2) using a fluorescence-detected-circular-dichroism (FDCD) spectrophotometer as a selective detector for chiral fluorophores, (3) using powerful computer algorithms such as global analysis for optimal interpretation of fluorescence lifetime data for several phase-modulated experiments.

Another instrumental application, the development of fiber optic based sensors, is discussed by Burgess et al. in a general review of recent developments in the field. A number of sensors were described including plain fiber sensors, evanescent field sensors and various optrodes utilizing immobilized fluorescent indicators. The authors point out that use of such mechanisms as competitive binding, energy transfer and immunoassay sensing techniques offer a variety of approaches to analytical fiber optic fluorosensing. Combined with the rapid development of wavequide technology and new laser and semiconductor sources, tremendous progress in fiber optics for analytical spectroscopic applications can be expected

Chemically and biochemically important processes and their applications to chromatographic techniques were discussed in the remaining papers

Kelly and Schulman described a modified form of the steady state treatment for the determination of excited state proton transfer rate constants The quantitation of excited state proton transfer kinetics was extended to several protonated N-heterocyclic amines

which are weak enough bases in the excited state to require concentrated mineral acids for protonation.

Geacintov discussed applications of fluorescence/luminescence techniques in chemical carcinogenesis research These included the detection, identification and studies of the properties of covalent carcinogen-DNA adducts using a variety of luminescence methods including synchronous fluorescence, immunofluorescence and low temperature fluorescence-line-narrowed (FLN) spectroscopy Using low temperature techniques may in the future broaden luminescence applications to include other classes of carcinogens in addition to polynuclear aromatic hydrocarbons

Cobb et al used HPLC combined with phase-modulated and phase-resolved spectrofluorometry for the analysis of mixtures of polycyclic aromatic hydrocarbons Synthetic mixtures containing up to 6 polynuclear aromatic hydrocarbons were successfully analyzed

The range of these papers illustrates the great utility of luminescence methods for many analytical applications The editors hope that these papers have provided examples of some of the areas in which considerable progress has been made recently in analytical luminescence Future volumes may discuss even more novel uses of state-of-the-art fluorescence and luminescence measurements

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