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Hydrazone as a new fluorophore in the peroxyoxalate chemiluminescence reaction

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Abstract

Peroxyoxalate chemiluminescence reactions involve the oxidation of oxalate ester by hydrogen peroxide (H_2O_2), forming intermediates capable of exciting fluorophores. These intermediates are known for their high sensitivity, quantum yield of chemiluminescence and wide linear range for analyte detection. This study aims at the application of complexing agents di-2-pyridyl ketone benzoylhydrazone and di-2-pyridyl ketone salicyloylhydrazone, or these agents complexed with Pb(II) as fluorophores, as well as use of these reactions for metal determination. Both complexing agents have fluorescent properties, however only the former could be applied. The buffering system used was $\text{HCO}_3^-/\text{CO}_3^{2-}$, pH 10.3 and the ester 2,4,6-trichlorophenyl oxalate, prepared in 1,2-dimethoxyethane. The addition of Pb(II) to the peroxyoxalate chemiluminescence reaction makes the signal decrease by 36%. Through the Stern-Volmer equation, it was possible to determine the ion within a range from 2.07 to 41.4 mg L^{-1} (R^2 0.9894), with detection and quantification limits of 0.45 mg L^{-1} and 1.5 mg L^{-1} , respectively.

1. Introduction

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