

Nitrone group-based chemosensor with selectivity towards Cu(II) ions

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The need for detection of metal ions in solution is present in various processes, such as environmental assessment or industrial product evaluation.[1] Copper(II) is one of the metal ions commonly present in these assessments, which poses a risk to human health if it exceeds a certain concentration.[1] Since its presence is constant, but its levels must be controlled, it becomes important to create practical and swift means to determine its concentration at the assessment site. As such, the application of chemosensors capable of selectively altering their absorption spectra in the presence of Cu(II) ions comes as a potential tool.[2] This work aims to evaluate the application of 2-(hydroxyphenyl)-*N*-phenyl nitron (Nit-OH) in the selective detection of Cu(II) ions in acetonitrile solution. Against nine other metal ions, Nit-OH presented high selectivity only for Cu(II) (Figure 1). To understand the formation of a Cu(II)-coordinated system, the stoichiometry of complexation was determined using Job's plot, and we additionally studied the kinetics of complexation and evaluated the limit of detection. We observed an excellent correlation between experimental spectral data and DFT and TD-DFT calculations, consolidating the usefulness of Nit-OH for Cu(II) selective detection and quantification.

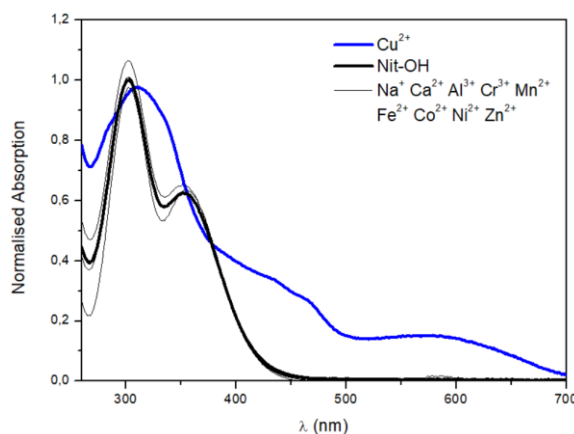


Figure 1. UV-Vis absorption spectra of Nit-OH in the presence of metal ions in ACN, at a 2:1 Nit-OH/metal ion ratio.

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References

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