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Colorimetric ability of a phenazine derivative towards Ag(I)

Lucas F. Bezerra[1,2], Mário O. Sanches[1], Sueslley G. G. Rodrigues[1], Dieric S. Abreu[3,4], and Izaura C. N. Diógenes[1]

[1]*Department of Organic and Inorganic Chemistry, Federal University of Ceará, Fortaleza-CE, Brazil*
[2]*Teaching Department, Federal Institute of Ceará, Ubajara-CE, Brazil*
[3]*Department of Analytical and Physical Chemistry, Federal University of Ceará, Fortaleza-CE, Brazil*
[4]*University of International Integration of Afro-Brazilian Lusofonia, Redenção-CE, Brazil*
E-mail:lucasfonsecab@alu.ufc.br

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Complexes of azaacenes with metals show significant changes in the ultraviolet and visible regions (UV-Vis) enabling visual detection, as reported for phenazine derivatives [1]. In this work, we present the results on the investigation of the colorimetric sensor ability of dihydrodipyridoquinoxalinophenazine (**dihydro-dpqpz**) − a reduced phenazine derivative − towards Ag(I) by UV-Vis spectroscopy. UV-Vis spectrum of **dihydro-dpqpz** showed a band at 550 nm assigned [2] to its HOMO-LUMO transition. After the addition of a solution of $AgNO_3$, this band disappears at the expense of a new one at 418 nm leading to a color change from pink to reddish-brown (Figure 1). The disappearance of the band at 550 nm indicates the oxidation of **dihydro-dpqpz** to pyridoquinoxalinophenazine (**dpqpz**), Figure 1, whereas the new band at 418 nm was assigned to the SPR band of Ag(0) [3]. A control experiment was performed in solution containing ascorbic acid resulting in no change of spectral profile indicating that, once bounded to **dihydro-dpqpz**, Ag(I) is reduced to Ag(0) oxidizing **dihydro-dpqpz** to **dpqpz** through an intramolecular electron transfer process. Therefore, tuning the reducing condition of the medium, **dihydro-dpqpz** showed to be able to detect Ag(I) in addition to experience self-regeneration. This feature is highly interesting when envisioning the use of **dihydro-dpqpz** as a colorimetric sensor that allows recovering by a redox reaction. Further studies are currently underway to determine the analytical figures of detection as well as the turnover number.

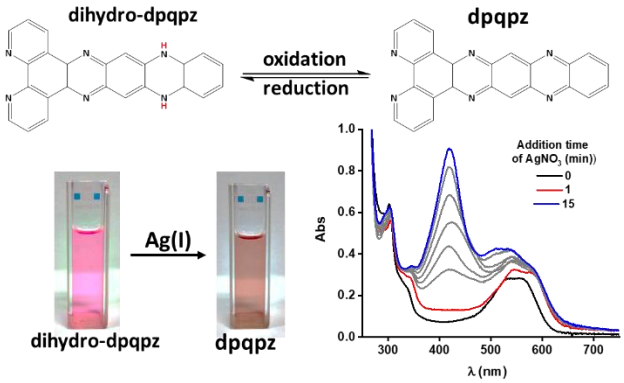

Figure 1. Illustrative scheme of the redox interconversion between **dihydro-dpqpz** and **dpqpz** (top), photographs (left bottom) of the **dihydro-dpqpz** solutions before (pink) and after (reddish-brown) addition of $AgNO_3$, and UV-Vis spectra (right bottom) of a **dihydro-dpqpz** solution as a function of the addition time of $AgNO_3$.

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