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A Zn-based coordination polymer with good ability for selective detection of mercury ions in solution

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$[Zn(NCS)Cl(L)]_n$ (Zn-SCP) is a one-dimensional coordination polymer with a terminal thiocyanate group. The flexible sulfur donor ligand is bridged between metal centers by the anti-anti-anti conformation which forms an infinite 1D zigzag chain and the third and fourth coordination spheres are occupied by terminal Cl^- and NCS^- anions [1]. Considering the HSAB concept (Hard-Soft Acid Base) [2], N-coordinated thiocyanate as a Lewis base has a good potential for coordinating mercury from its free sulfur atom. In this work, we have used Zn-SCP for the detection of Hg^{2+} from water solution with different consecrations. Mercury has been coordinated to the free sulfur of thiocyanate groups as it was excepted. The IR spectrum of Zn-SCP showed a remarkable shift for the NCS peak from 2070 cm^{-1} to 2120 cm^{-1} which clearly shows the change in the coordination sphere. The white color of Zn-SCP powder was changed to grey by coordination with mercury [3]. It is worth mentioning that Zn-SCP has selectivity in the detection of mercury and there were no changes for other metals such as Pb^{2+}, Cd^{2+}, or copper. FT-IR, UV-visible, and ICP have confirmed the binding of mercury to thiocyanate. The Hg^{2+} ions which are coordinated to the Zn-SCP could be removed from the water solution by simple filtration.

Keywords: **Mercury detection; Sulfur coordination polymer; Zn complex; Methimazole based ligands**

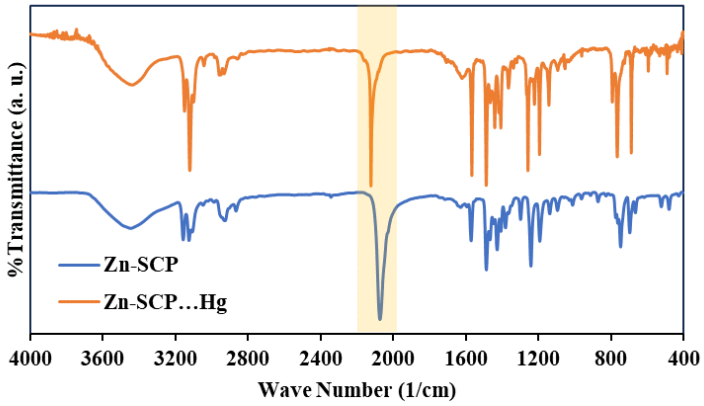


Fig 1. The FT-IR spectra of as-synthesized Zn-SCP and exposed to Hg^{2+} cations.

References

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