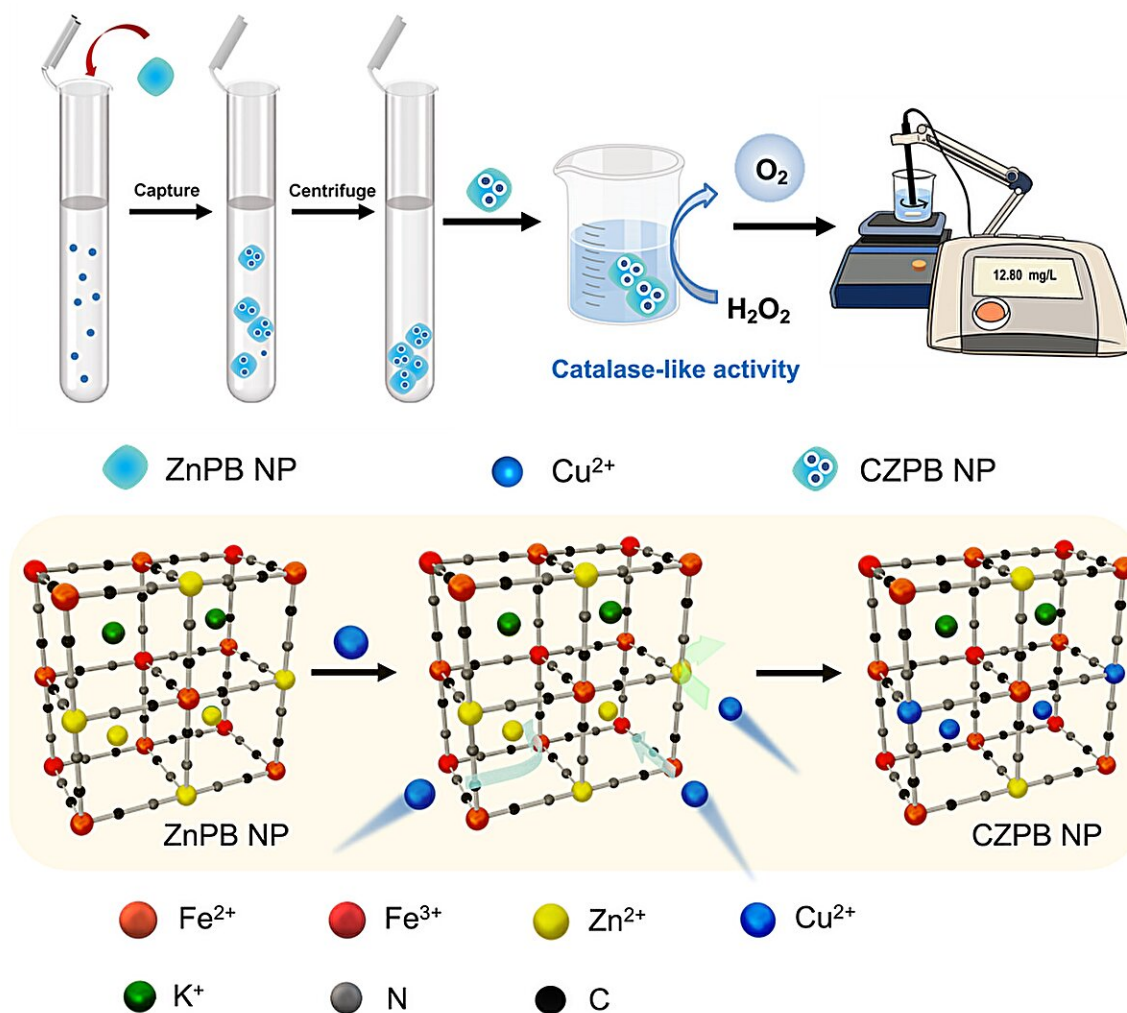


Zinc-doped Prussian blue nanozyme serves as all-in-one copper sensor

October 11 2023, by Zhang Nannan



Detection of Cu^{2+} . Credit: Yuan Xue

Researchers led by Prof. Wu Zhengyan and Zhang Jia from the Hefei Institutes of Physical Science of the Chinese Academy of Sciences (CAS) have developed an all-in-one nanozyme for the capture, separation and detection of copper ion (Cu^{2+}) in complicated matrixes, achieving accurate detection of copper ions. The study was published in the journal [*Small*](#).

Copper is an essential trace element for the [human body](#) and an important component of agricultural fungicides. When [copper](#) accumulates to a certain concentration, it affects [human health](#) and [soil quality](#). Given the important physiological role and potential hazards of copper, there is an urgent need to develop new methods for detecting [copper ions](#) in complex systems.

In this study, the researchers developed an all-in-one nanozyme based on zinc-doped Prussian blue nanoparticles (ZnPB NPs).

The signal generated by ZnPB NPs showed a positive correlation with the copper level due to the enhanced catalase-like activity of ZnPB NPs in the presence of copper ions. Consequently, the ZnPB NPs served as a comprehensive sensor for copper ions, offering a simple yet reliable solution to detect copper.

"It can efficiently capture, separate and detect copper ions with good selectivity and interference resistance," said Yuan Xue, a member of the research team, "and can be used for the determination of copper ions in undiluted human urine and soil."

Compared with the data obtained by inductively coupled plasma-optical emission spectroscopy (ICP-OES), this method has excellent copper ion detection accuracy while significantly reducing the cost.

This all-in-one nanozyme offered a viable and easy-to-implement

solution for people in under-equipped areas and regions to monitor or evaluate copper levels associated with human and soil health status.

More information: Ying Zhang et al, All-in-One Zinc-Doped Prussian Blue Nanozyme for Efficient Capture, Separation, and Detection of Copper Ion (Cu^{2+}) in Complicated Matrixes, *Small* (2023). [DOI: 10.1002/sml.202306961](https://doi.org/10.1002/sml.202306961)

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