Rapid Fe^{3+} and Cu^{2+} ions detection nanodots were developed

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Iron and copper are two important nutrient elements for human health, which rank the second and third most essential trace metal elements in the human body. They also play significant roles in the natural environment. However, excessive intake or emission of iron or copper will lead to diseases and disasters. Therefore, it is particularly important for human health and monitoring of the environment to develop practical and efficient technologies for field analysis and rapid determination of iron and copper ions with high sensitivity and selectivity.

The scientists from the ACSIPP developed an extremely simple and green hydrothermal treatment of bulk g-C_3N_4 to form F-g-C_3N_4 dots with blue emission and high quantum yield (QY), which were applied as a very effective fluorescent probe for label-free selective and sensitive detection of Cu^{2+} and Fe^{3+} ions with a limit of detection (LOD) as low as 0.5 nM and 1.0 nM, respectively. The F-g-C_3N_4 dots were also successfully used to detect Fe^{3+} and Cu^{2+} ions in natural water obtained from the Dongpu Lake of Hefei, Anhui Province, China.

These findings open up a simple, low-cost route toward green production of F-g-C_3N_4 dots fluorescent probes for fast, highly selective, and sensitive optical detection of Fe^{3+} and Cu^{2+} ions, and show the application potential in drinking water detection.

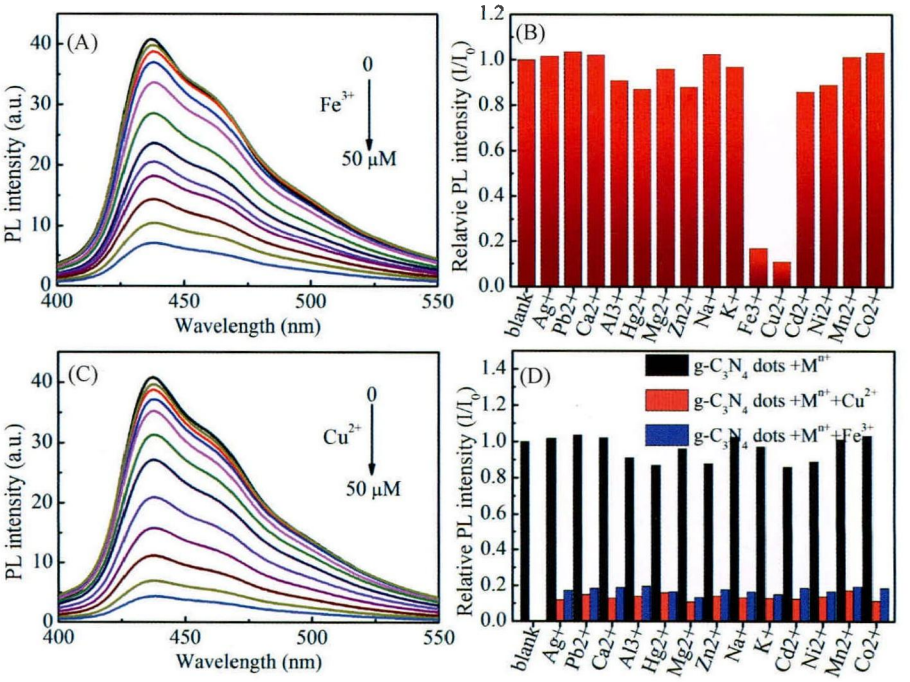

Figure PL intensity changes of F-g-C_3N_4 dots for different concentrations of Fe^{3+} (A) and Cu^{2+} (C). (B) The difference in relative PL intensities of F-g-C_3N_4 dots between the blank and solutions containing different metal ions. (D) Selective relative PL intensities of F-g-C_3N_4 dots.