

"All-in-one" chemosensor for selective optical sensing of copper ion using mesoporous carbon nitride

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With recent advances in industry, large amount of toxic and carcinogenic metals have been released into the environment, which strongly raised the interest in biological and environmental monitoring of such compounds. Various optical sensors based on azo-coupled macrocycles, porphyrin and phenanthroline derivatives have been described for the detection of a wide range of metal ions. There is however still growing demands for more advanced optical sensing system with lower detection limit and faster kinetic response. Considering the properties of present chromogenic/fluorescent receptors, it seems that nanostructured g-C₃N₄ would be a promising alternative. The electronic structure of g-C₃N₄ is adjustable by coupling events of protons or metals to the surface. The surface functionalities of g-C₃N₄, i.e. -NH₂/-NH-/=N-, are well-characterized ligands exhibiting high adsorption capability for metal ions through chelation or redox reaction. Finally, an additional supporting material is not necessary because it is possible to tailor its nanostructure by using any kind of silica hard template.