Ultrafast and Nanomolar TNP Detection in Water by Fluorescent MOF

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Examples of metal organic frameworks (MOFs) as multifunctional porous materials are in huge demand for their applications ranging from sensing, catalysis, gas/vapor sorption for storage and separation, drug delivery, etc.¹ ² For our continued contribution³ to this emerging field, we have designed a series of new ligands to make multifunctional MOFs in high yields for showcasing their versatile applications in several areas. In this presentation, based on a new electron-deficient triazine-based dicarboxylate ligand 5-((4,6-diamino-1,3,5-triazin-2-yl)amino)isophthalic acid (H₂ATAIA), a 3D MOF [[Cd(ATAIA)].4H₂O]n (1) has been synthesized at two different temperatures and structurally characterized by numerous analytical techniques. This amine-functionalized fluorescent MOF has been applied for highly selective, sensitive and ultrafast detection of picric acid in water with a limit of 0.94 nM (or 0.2 ppb). Furthermore, in a prototype experiment the response to TNP vapor by 1 has shown similar results.


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