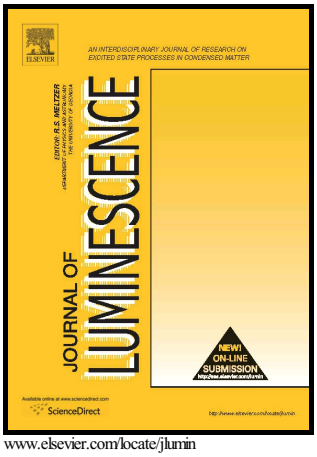

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Abstract

We fabricated supermicroporous, switchable, colorimetric and fluorometric chemosensors on a Zr-metal–organic framework platform. The chemosensors could be applied in the selective and sensitive colorimetric and fluorometric detection of ultra-trace concentrations of heavy metals, such as Bi^{3+} ions, in water sources. We fabricated supermicroporous fluorescent chemosensors (SFCs) through direct dressing of rhodamine ethylene–diamine salicylaldehyde (RES), a water-insoluble organic probe, onto Zr-MOFs. The decorated SFCs with uniform super-microchannel pores, long-range intergrowing crystal structure, and active hook surface sheaths act as sensitive and selective chemosensor carriers. The selectivity of the colorimetric and fluorometric sensing assay for Bi^{3+} ions in a heterogeneous mixture with multiple cations and anions depends on the structure of the RES, the pH of the system, the composition of the competitive ion system, and the process of Bi-to-RES binding, which occurs through a mechanism that involves fluorescent