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Stimuli Responsive Switchable Chemical Sensors

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The development of real-time, highly sensitive chemical sensors for the detection of very low analyte concentrations is of significant interest and importance for monitoring levels of harmful chemicals in the environment. The unique properties of the rare-earth metals enables sharp and narrow luminescent signals to be obtained. The incorporation of rare-earth ions into sensor systems offers significant advantages for enhancing the sensor response, allowing greater discrimination between chemical analytes.

Coordination polymers (CPs) and Metal-Organic Frameworks (MOFs) are crystalline materials containing inorganic nodes bridged by multidentate ligands. The high porosity and tunability of CPs enable the systematic modification of pore chemistry and size. Tailored pore environments can be designed, making these materials well-suited to act as chemical sensors. Rare-earth coordination polymers remain relatively less explored than transition metal coordination polymers due to their higher coordination numbers and unpredictable coordination environments. Reports of rare-earth coordination polymers containing a redox-active ligand are still relatively scarce in the literature despite the potential they present for enhanced chemical sensing and the development of magnetic and switchable materials.

This presentation will discuss the synthesis and properties of an isostructural series of rare-earth coordination polymers containing a redox-active viologen ligand. The viologen moiety is able to undergo a reversible one electron reduction upon exposure to a light or electrochemical stimulus. The electrochemical, photochromic and sensing ability of the materials will be discussed and their potential for application in the development of chemical sensors highlighted.

Level of Expertise

Early Career <5 Years

Presenter Gender

Woman

Pronouns

She/Her

Which facility did you use for your research

Australian Synchrotron

Students Only - Are you interested in AINSE student funding

Do you wish to take part in the Student Poster Slam

Condition of submission

Yes

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