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High-pressure, fluorescence-based sensing of calcium ions using Indo-1[1] JORDAN RYAN, ERIK ZACHWIEJA, SARA R. SAVAGE, PAUL URAYAMA, Miami University — Because calcium is used as a near-universal signaling ion in biological systems, accurate sensing of calcium-ion concentration under pressure is important in understanding pressure effects on cellular physiology. Indo-1 is a dual-wavelength fluorophore with an emission spectrum that changes upon calcium-ion binding. Despite studies under physiological pressures of up to 50 MPa showing piezochromic behavior in the excited-state emission, Indo-1 continues to follow two-state binding-unbinding behavior. This demonstrates that Indo-1 remains useful under pressure as a probe for quantitative calcium-ion sensing. The two-state model is also used to determine the thermodynamic volume change upon calcium dissociation from Indo-1, which we find to be consistent with other metal-ion chelators.

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