

Abstract Submitted
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Sensing calcium ions at high hydrostatic pressure using the dual-wavelength calcium-sensitive dye indo-1¹ JORDAN RYAN, PAUL URAYAMA, Miami University — Because calcium often serves as a signaling ion in biological systems, accurate sensing of calcium-ion concentration under pressure is important in understanding cellular piezophysiological effects. Indo-1 is a dual-wavelength fluorophore routinely used for calcium-ion sensing at ambient pressure, with an emission spectrum that changes upon calcium-ion binding. When subject to physiological pressures of up to 50 MPa, we observe piezochromic behavior in the excited-state emission which depends more on solvent polarity than on solvent viscosity. A two-state model is used to determine the thermodynamic volume change upon calcium dissociation from indo-1, which we find to be consistent with the value for other metal-ion chelators. Since, despite its piezochromicity, indo-1 continues to follow two-state binding-unbinding behavior, indo-1 remains useful under pressure as a probe for quantitative calcium-ion sensing.

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