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Title: Evaluation of a hyperbaric system to be used in conjunction with a fluorometer

Authors: Colton, JS
Grossman, Y
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Abstract: A high-pressure chamber that can be used inside the sample chamber of a spectrofluorometer is described and some performance characteristics are presented. The chamber body, constructed of 316 stainless steel, is temperature regulated using resistive heating elements and a microprocessor-based proportional integral derivative controller. The chamber holds a standard 1-cm² cuvette that indexes with an electromagnetic stirrer. Injection of different solutions into the closed and pressurized (6.8 MPa) vessel is accomplished by computer-controlled, low-volume solenoids attached to separate microliter injection ports. Repetitive injections of fluids down to a volume of 7 microliters are possible in the pressurized chamber. Temperature stability of the chamber is +/- 0.2 degrees C at atmospheric or elevated pressure. However, during the initial phase (first 3 min) of pressurization, at a compression rate of 0.62 MPa/min, a 0.23 degrees C/min increase in temperature occurs. The chamber windows depress the relative intensity of the emitted light by approximately 20% for visible light and 40% for near UV; however, total sensitivity of the system is sufficient to accomplish most determinations while maintaining a good signal-to-noise ratio. This system can be used to evaluate the response of several molecular and cellular events during compression and at depth with the use of various fluorometric probes.

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