Observation of Isotope Effects in Sonoluminescence [Phys. Rev. Lett. 75, 3549 (1995)]

Robert A. Hiller and Seth J. Putterman

[S0031-9007(96)01158-1]

Further investigations, aimed at understanding our claim that isotope substitution affects sonoluminescence (SL), led us to attempt to measure the spectrum of light emission from xenon bubbles in light and heavy water. While the large difference between curves *a* and *b* supports an isotope effect, we found that the spectrum was dependent upon the batch of commercially available heavy water used (curves *c* and *d*). It is clear that we have not yet determined the complete set of experimental parameters that must be controlled so as to obtain reproducible results. In particular, we are concerned that impurities at concentrations of ppm not only affect the intensity [1] but also the spectral density (see curve *e*). In order to reconsider the dramatic effects reported for hydrogen bubbles in Fig. 2 of our Letter we are increasing our light collection capabilities. While we stand by that data we are obliged to report that its interpretation in terms of an isotope effect should be regarded as premature.

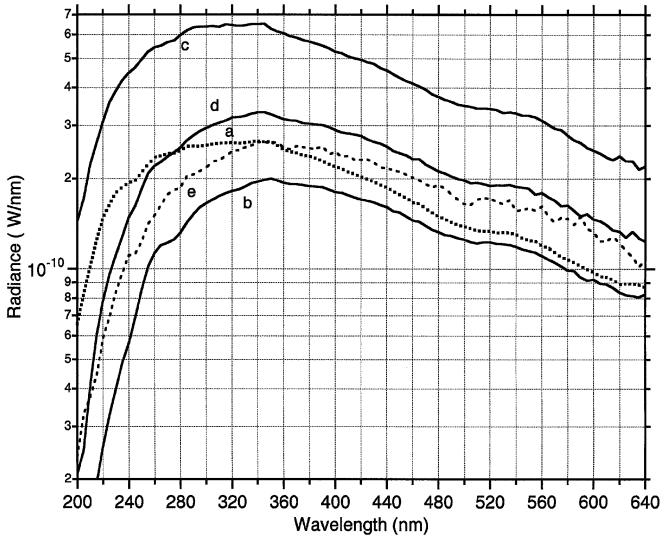

FIG. 2. Spectra of sonoluminescence from xenon bubbles in light and heavy water containing xenon dissolved at a partial pressure of 3 mm; curves *a* and *b* are for light water and the first batch of heavy water in a spherical resonator, curves *c* and *d* are for other batches of heavy water in a cylindrical resonator, and curve *e* is for water with 2.5 ppm 1-butanol, multiplied by 7.3 to align it with pure water at 340 nm.

[1] K. Weninger *et al.*, J. Chem. Phys. **99**, 14 195 (1995).

