

Taleyarkhan *et al.* Reply: Lipson (preceding Comment [1]) brings up insightful points, which we clarify for the record in relation to our Letter [2].

(i) *Response to comments on neutron output assessments from the liquid scintillation NE-213-type detector.*—Page 9 of Ref. [3] [Table I, Figs. 9(b), 11, and 12] demonstrates a very significant ≤ 2.45 MeV neutron emission amounting to ~ 17 standard deviations (SD) [for an individual case shown in Fig. 9(b)] and ~ 30 SD (for the aggregate of all data), respectively. From Ref. [4] the calibrated detection efficiency is $\sim 2 \times 10^{-4}$ at ~ 18 cm from a Pu-Be source emitting $\sim 2 \times 10^6$ n/s. At ~ 30 cm, the efficiency becomes $\sim 7 \times 10^{-5}$ [$= 2 \times 10^{-4} \times (18/30)^2$]. The neutron emission rate is thus $\sim 4 \times 10^4$ n/s [$= 3/(7 \times 10^{-5})$] for a measured neutron count rate of ~ 3 counts/s.

(ii) *Response to the comment on CR-39 neutron track detectors.*—Lipson mistakenly includes data in lines 10–12 on top of Table II of [3] where results are null or $\ll 1$ SD [i.e., cases for tests with heavy water (D₂O) or for the control experiments]. For overall statistics, the “aggregate” of data needs to be assessed for deuterated benzene-mixture tests with cavitation on. Table II of [3] presents results from 7 separate track detectors with a 2 h etch (lines 4, 5, 11, and 12). Aggregate statistical significance rises to ~ 6 SD [$\sim (7 \times 2^2)^{1/2}$]. Larger etch time (8 h and 14 h) data also showed individual increases of ~ 2.3 SD and ~ 2.9 SD (for the 8 h etch) and ~ 3.1 SD (for the 14 h etch) [3]. Altogether, we obtain ~ 8 SD [$= (6^2 + 2.3^2 + 2.9^2 + 3.1^2)^{1/2}$]. For all other control cases, the overall changes are $\ll 1$ SD.

The intrinsic efficiency for fast neutron track detection is $\sim 3 \times 10^{-5}$ [2,3]. Since the ~ 1 cm² detectors are ~ 3.5 cm from the central axis of the test cell, the efficiency reduces by 6.5×10^{-3} [$= 1/(4 \times \pi \times 3.5^2)$] to $\sim 2 \times 10^{-7}$ and liquid attenuation reduces the efficiency by ~ 2 to $\sim 10^{-7}$. Typically, ~ 12 tracks over 7200 s implies a neutron emission rate of $\sim 2 \times 10^4$ [$= (12/7200)/10^{-7}$].

We disagree with Lipson’s contention that significant tracks accumulate in 2 h because in all control experiments the preexisting tracks did not change (i.e., remained virtually zero) “during” 2 h (7200 s) [see Table II of [3]]. Therefore, the additional tracks accumulated over preexisting tracks represent, in fact, a huge ($>1000\%$) relative increase.

(iii) *Response to comments on data with a thermal neutron detector.*—The Erratum [5] clarifies that our thermal neutron detector (TND) was Li based and produced pulses proportional [6] to the energy of the charged particle. A Pu-Be source emits neutrons and monoenergetic 4.4 MeV γ rays [6] but the ${}^6\text{Li}(n, \alpha){}^3\text{H}$ reaction also has a “Q” of ~ 4.78 MeV from which the 4.4 MeV γ rays from the Pu-Be source are detected [3] in the same peak region as the ${}^6\text{Li}(n, \alpha){}^3\text{H}$ reaction products accompanied with a continuum of voltage pulses in lower channel num-

bers. The pulse-height dependence with incoming γ ray energy has been quantified [see Figs. 2(b) and 2(c) of Ref. [3]].

In our experiments cavitation was turned off by a slight frequency shift (i.e., $\ll 1\%$), all the time keeping the amplifier power on as for cavitation on for deuterated “and” control (H-bearing) liquids (for which we see that electromagnetic effects in the lower channels will be small to negligible). Neutrons from the D-D fusion reaction strike surrounding atoms (Cl, H, etc.) before reaching the TND and result in γ rays of ~ 0.5 to 2 MeV. Neutrons absorbed in Cl, H, etc., get counted in the γ region and may be legitimately included, albeit with some uncertainty. Therefore, we estimate neutron emission rates including all excess counts as well as separately with counts in the peak channels alone.

At 10 cm from the Pu-Be (2×10^6) source the calibrated TND count rate is ~ 222 counts/s [3] and distance-corrected efficiency is $\sim 9.1 \times 10^{-6}$ [$= 222 \times (10/35)^2/2 \times 10^6$], which reduces by ~ 2 (for losses in the test liquid) and by ~ 2 due to ice packs and shielding. Neutron emission is thus $\sim 4 \times 10^4$ n/s (75 counts over 3600 s divided by 2×10^{-6}). Even for excess counts only in the neutron window we still arrive at a value close to $\sim 10^4$ n/s. All three independent detectors give estimates of $\sim 10^4$ n/s.

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