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## Chemistry Casts Doubt on Bubble Reactions

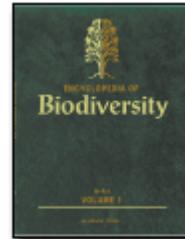
A controversial claim that scientists had detected signs of fusion in a rapidly collapsing bubble may have further imploded this week. A new experiment that measures the energy budget of a collapsing bubble for the first time indicates that so-called "bubble fusion" is unlikely to occur.

The controversy involves a peculiar phenomenon known as sonoluminescence. If liquid is zapped with sound waves in the right manner, it will "crack," creating bubbles that contract so violently that they glow with light. Earlier this year, Science published the results of such an experiment by engineer Rusi Taleyarkhan of Oak Ridge National Laboratory in Tennessee and five colleagues. The group reported the detection of neutrons that they argued were generated by a fusion reaction inside a sonoluminescing bubble. The claim was greeted with skepticism even before it was published (Science, 8 March, pp. 1808 and 1868).

Now two scientists have taken a close look at whether enough energy is available in an imploding bubble for fusion. Kenneth Suslick and Yuri Didenko, sonochemists at the University of Illinois, Urbana-Champaign, used fluorescent dyes to measure the byproducts of sonoluminescence in water. From the concentrations of these molecules created by different single-bubble sonoluminescence experiments, Suslick and Didenko figured out the conditions that led to those reactions--and where the energy goes when the bubble collapses. Most of the energy is dissipated by chemical reactions, Suslick reports in the 25 July issue of Nature, noting that the experiment roughly matches theorists' expectations.

The new work implies that sonoluminescence--especially in a volatile liquid such as acetone--is highly unlikely to initiate fusion. "They're saying, 'We understand what's going on inside the bubble,' and if this is what you believe the science is, you should be suspicious of the Taleyarkhan paper," says Lawrence Crum, an acoustician at the University of Washington, Seattle, and one of the first people to study single-bubble luminescence. Taleyarkhan could not be reached for comment.

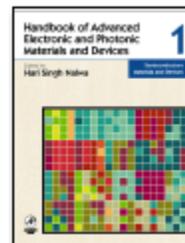
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