

Accepted Manuscript

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PII: S1350-4177(18)30464-4

DOI: <https://doi.org/10.1016/j.ultsonch.2018.05.038>

Reference: ULTSON 4196

To appear in: *Ultrasonics Sonochemistry*

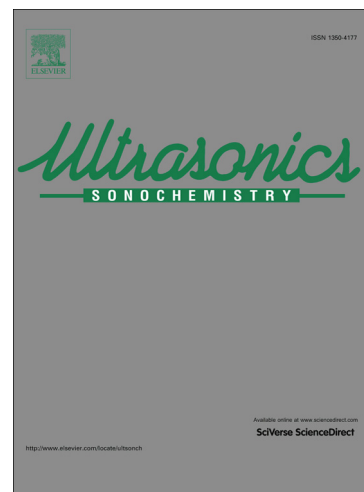
Received Date: 22 March 2018

Revised Date: 11 May 2018

Accepted Date: 29 May 2018

Please cite this article as: K. Yasui, T. Tuziuti, W. Kanematsu, Mysteries of bulk nanobubbles (ultrafine bubbles); Stability and radical formation, *Ultrasonics Sonochemistry* (2018), doi: <https://doi.org/10.1016/j.ultsonch.2018.05.038>

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Mysteries of bulk nanobubbles (ultrafine bubbles); Stability and radical formation

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Abstract

There are two main mysteries in bulk nanobubbles which are cavitation nuclei. One is the mechanism of stability of a bulk nanobubble. The other is the problem whether OH radicals are produced from bulk nanobubbles without a dynamic stimulus. For the former problem, several proposed models are briefly reviewed. The dynamic equilibrium model is discussed in details that a bulk nanobubble is stabilized by a partial coverage of the bubble surface by a hydrophobic material. The TEM images of bulk nanobubbles seem to support the dynamic equilibrium model. For the latter problem, numerical simulations of dissolution of an air nanobubble are reviewed, which suggest that no OH radical is produced from a dissolving nanobubble. A possible role of H₂O₂ generated during bulk nanobubble production using hydrodynamic cavitation is briefly discussed in relation to the experimental results of “OH radical” detection.

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