

Structural Design of Sonochemical Reactor to Enhance Energy Transfer Efficiency and Anticorrosion Effect

Authors : Jin- Ho Han

Abstract : This study focuses on the design of a sonochemical reactor that has excellent anticorrosion effect and acoustic pressure distribution by optimization of the reaction vessel. Sonochemical reactors using the Barbell horn transducer have advantages, including high efficiency of energy conversion, large amplitude of the transducer and low damping. Meanwhile, we performed COMSOL optimization simulations to minimize the corrosion of the horn and the inner wall of the reaction vessel by cavitation bubbles during the sonochemical reaction. It was experimentally verified that the immersion depth of the horn obtained by simulation and the geometric parameters of the vessel are suitable for optimization purposes. In this way, a sonochemical reactor with good acoustic pressure distribution and suitable for obtaining a purer reaction product can be designed.

Keywords : sonochemical reactor, COMSOL optimization simulation, immersion type, barbell horn

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