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**Effects of non-condensable gas on the dynamic oscillations of cavitation bubbles**[1] YUNING ZHANG, North China Electric Power University — Cavitation is an essential topic of multiphase flow with a broad range of applications. Generally, there exists non-condensable gas in the liquid and a complex vapor/gas mixture bubble will be formed. A rigorous prediction of the dynamic behavior of the aforementioned mixture bubble is essential for the development of a complete cavitation model. In the present paper, effects of non-condensable gas on the dynamic oscillations of the vapor/gas mixture bubble are numerically investigated in great detail. For the completeness, a large parameter zone (e.g. bubble radius, frequency and ratio between gas and vapor) is investigated with many demonstrating examples. The mechanisms of mass diffusion are categorized into different groups with their characteristics and dominated regions given. Influences of non-condensable gas on the wave propagation (e.g. wave speed and attenuation) in the bubbly liquids are also briefly discussed. Specifically, the minimum wave speed is quantitatively predicted in order to close the pressure-density coupling relationship usually employed for the cavitation modelling. Finally, the application of the present finding on the development of cavitation model is demonstrated with a brief discussion of its influence on the cavitation dynamics.

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