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Numerical simulation on subcooled pool boiling bubble behavior YASUO OSE, TOMOAKI KUNUGI, Kyoto University — In this study, it is focused on the clarification of the heat transfer characteristics of the subcooled pool boiling, the discussion on its mechanism, and the establishment of a boiling and condensation model for the direct numerical simulation on the subcooled pool boiling phenomena. In this paper, the boiling and condensation model has been improved by introducing the following models based on the quasi-thermal equilibrium hypothesis: (1) an improved phase-change model which consisted of the enthalpy method for the water-vapor systems, (2) a relaxation time derived by considering the unsteady heat conduction at the vapor-water interface. Then, unsteady three dimensional numerical simulations based on the MARS (Multi-interface Advection and Reconstruction Solver) with the improved boiling and condensation model were performed for the bubble departing process from the heated surface. The results of the numerical simulations were compared with the experimental data obtained by the high-speed camera (Phantom 7.1) with the Cassegrain optical system. As the results, the numerical results of bubble departure behavior from the heated surface showed in good agreement with the experimental observations quantitatively.

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