DESCRIPTION

The monograph is devoted to the description of the kinetics of spontaneous boiling of superheated liquefied gases and their solutions. Experimental results are given on the temperature of accessible superheating, the limits of tensile strength of liquids due to processes of cavitation and the rates of nucleation of classical and quantum liquids. The kinetics of evolution of the gas phase is studied in detail for solutions of cryogenic liquids and gas-saturated fluids. The properties of the critical clusters (bubbles of critical sizes) of the newly evolving gas phase are analyzed for initial states near the equilibrium coexistence curves of liquid and gas, for states near the limits of accessible superheating and for initial states near the respective spinodal curves. Finally, processes of explosive boiling of cryogenic liquids are considered occurring as the result of outflow processes and intensive interactions with high-temperature liquid samples.

ABOUT THE AUTHOR

Vladimir G. Baidakov studied physics and completed his PhD-thesis at the Ural Institute of Technology in Ekaterinburg, Russia. Since 1973, he is working at the Institute of Thermal Physics of the Russian Academy of Sciences also in Ekaterinburg, in recent years as a Vice-Director for Research and presently as the Director of this institute and the Head of the Laboratory of Cryogenics and Energetics. Prof. Baidakov's work focuses on experimental and theoretical investigations of the kinetics of first-order phase transitions, in particular, on the investigation of the kinetics of boiling, the analysis of bulk and surface properties of fluids in thermodynamically stable and metastable states, the investigation of the properties of bubbles of critical sizes determining the rate
of bubble formation. The results of the work of V.G. Baidakov and his coworkers are outlined in 6 monographs and 125 journal publications. In acknowledgment of his results, in 1999 he was awarded with the Russian State Prize in Science and Technology.