

## HEAT TRANSFER CHARACTERISTICS OF THE VAPOR-LIQUID-SOLID BOILING FLOW IN A FLUIDIZED BED EVAPORATOR

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Abstract: The heat transfer enhancement mechanism of the vapor-liquid-solid three-phase boiling flow in a fluidized bed evaporator was explained in a new way. The subject was investigated with comprehensive standard deviation, power spectral density, wavelet decomposition analyses of differential pressure, vibration acceleration, volume flow and temperature signals. Main results are as follows. The generation of big vapor bubbles and the length of vaporization section can be reflected in the downward spikes and standard deviation of differential pressure signals, which responds to boiling heat transfer process. The main influence of solid particles on tube wall is axial shear force and the volume flow of the mixing flow is balanced by the driving force and flow resistance, which relate to the convective heat transfer process. As the steam pressure grows, the heat transfer process is enhanced due to the increased vaporization section length and volume flow of mixing flow. The improvement of heat transfer process with solid holdup is mainly attributed to the collision of solid particles to tube walls.