TITLE: NUCLEATE BOILING STUDY INSIDE THE EVAPORATOR OF THE PLANAR LOOP HEAT PIPE

ABSTRACT

The Loop Heat Pipes (LHP) under development is a next generation micro heat transfer device that utilizes the latent heat of a working fluid and has excellent transfer capacity compared with that of the capability of standard metallic cooling devices. A typical LHP consists of an evaporator, a reservoir (also called the compensation chamber), vapor and liquid lines, a subcooler, and a condenser. As heat is applied to the evaporator, liquid is vaporized. The nucleate boiling inside the evaporator is very significant phenomenon, which affects critical operating issues like start-up and primary wick dry out. The roughness of the surface (silicon), wall temperature, and pressure of the working fluid are variables of nucleation and to get the relationship between them is the goal of this research. Several silicon wafers having different roughness were selected for this study and DI-water was utilized as a working fluid. To uniformly apply the heat to the silicon surface, a Kapton heater was used and transient conditions inside the chamber were monitored through a Pyrex Glass having a highly polished inner surface.