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EXPERIMENTAL STUDY OF THE START-UP HEAT AND MASS TRANSFER PERFORMANCES OF POROUS PLATE WATER SUBLIMATOR COMBINED WITH FLUID LOOP

Abstract

Sublimator is an ideal heat rejection device at present for the spacecraft with peak heat loads or spacecraft which couldn't produce efficient radiation surface. For the spacecraft pumped fluid loop thermal control system(PFLTCS) which use sublimator as the supplemental heat rejection device, waste heat generated from the multi-point distributed heat sources could be collected by the fluid loop efficiently, and makes the installation of sublimator becomes more flexible. However, the transient heat and mass transfer performances of the sublimator combined with fluid loop is not adequately studied in the previous researches. This context studied the porous plate water sublimator start-up transient performances, heat and mass transfer performances and work stability. Influences of the fluid loop temperature and feed water pressure on the sublimator transient performances are also analysesed. The results showed that, the sublimator start-up response time rarely influenced by the fluid loop temperature, due to the excellent self-

adjust ability of sublimator. While the feed water pressure affects the sublimator start-up performances distinctly, increasing of the feed water pressure in rational amplitude could decrease the start-up response time and increase the heat rejection ability.