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PARAMETER STUDY OF HEAT SHIELD TEMPERATURE INFLUENCE ON HEAT TRANSFER CHARACTERISTICS OF CAPSULE BACK SHELL

Abstract

Numerical simulation of capsule base flow (AS-202) has been performed to investigate the heat shield temperature influence on heat transfer characteristics of back shell. A two-dimensional numerical study is first carried out on several meshes to seek a proper mesh size for a mesh free solution. Then Parameter study of heat shield temperature ranging from 300K to 1000K have been carried out to investigate the wall temperature influence on back shell heat transfer rates. The result shows that the heat transfer characteristics of capsule back shell are highly dependence on the heat shield temperature and for the extreme case heat shield with 1000K wall temperature results in a 90% increase on base heat flux over that with 300K wall temperature. The alteration of boundary layer temperature profile and transferring of near wall high temperature air to the vicinity region of base surface are responsible for the additional heating.