

Numerical Simulation of Phase Change Materials (PCM) with Nano-Suspensions

Shuying Wu ^{C, S}, Dongsheng Zhu and Nan Wang

School of Chemistry and Chemical Engineering, South China University of Technology, Guangzhou, Guangdong, China

Nano-scale heat transfer is the subject of a research upsurge all over the world, and the abnormal heat-transfer behaviour of nano-suspensions represents one of the hottest topics in this area. This study aims to evaluate the potential of nano-suspensions as a new phase change material for the thermal energy storage of cooling systems. The heat transfer enhancement in a two-dimensional enclosure containing nano-suspensions is solved using Fluent 6.2 software. Starting with steady natural convection, the phase change behavior is simulated considering different volume fractions of nano-suspensions. The simulation results show that the freezing rate of nanofluids is enhanced due to the addition of nanoparticles. The higher the volume fraction, the shorter the total freezing time. The computation results show that nano-suspensions can be used as a new phase change materials in latent heat thermal energy storage systems.