

**EFFECTS OF FLOW MODE TRANSITION ON HEAT TRANSFER ENHANCEMENT WITH  
NANOFLUIDS IN RECTANGULAR CAVITY**

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**SUMMARY:** Rayleigh-Bénard convection heat transfer of nanoparticle suspensions in rectangular tilted enclosures is investigated numerically. A single-phase model is adopted where both the fluid phase and the solid particles are in thermal equilibrium state and flow with the same local velocity. The heat transfer enhancement is calculated for different operating conditions, cavity aspect ratios, Rayleigh numbers and particle volume fractions. The main results overlap with previous studies and the agreement with them is satisfactory. In particular, flow mode transition affects considerably the heat transfer enhancement with nanofluids. Unlike conduction, systematic and definite deterioration in convective heat transfer enhancement has been found to occur. The deterioration of heat transfer enhancement is dependent on Rayleigh number as well as the aspect ratio of the cavity. The enhancement drop down is more pronounced for higher nanoparticles concentration.