

EXPERIMENTAL INVESTIGATION OF NANOFLUID POOL BOILING UNDER ELECTRIC FIELD

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SUMMARY: The effect of electric field on nucleate boiling and critical heat flux (CHF) of nanofluid at atmospheric pressure on a horizontal thin Ni-Cr wire was investigated experimentally. Fe_3O_4 nanoparticles were dispersed in 50%v ethylene glycol/DI water as a base fluid in different concentrations. Buildup of porous layer of nanoparticles on the heater surface was observed during nucleate boiling. This layer improved the surface wettability and increased CHF. Maximum CHF enhancement was observed at 0.1%v nanoparticle concentration to be about 100%. The porous layer decreased boiling heat transfer coefficient due to reduction of nucleation sites density. By applying an electric field (15kV voltage) boiling heat transfer coefficient of nanofluid increased, while CHF remained almost unchanged.