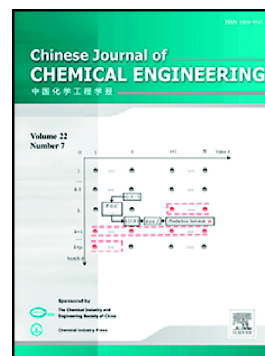


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Investigations on pool boiling critical heat flux, transient characteristics and bonding strength of heater wire with aqua based reduced graphene oxide nanofluids

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Fluid Dynamics and Transport Phenomena

Investigations on pool boiling critical heat flux, transient characteristics and

bonding strength of heater wire with aqua based reduced graphene oxide

nanofluids

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Abstract

In the present work, the pool boiling critical heat flux, transient heat transfer characteristics, and bonding strength of thin Ni-Cr wire with aqua based reduced graphene oxide (rGO) nanofluids are experimentally studied. Results indicate: (i) the critical heat flux (CHF) of 0.01, 0.05, 0.1, 0.2, and 0.3 g/l concentrations of rGO-water nanofluids varies from 1.42 to 2.40 MW/m² (ii) the CHF remains same for the tested samples during transient heat transfer studies and (iii) a constant value of CHF upto 10 tests when the nanocoated Ni-Cr wire is tested with DI water and deterioration occurs beyond this which implies a chance of peel off of rGO layer below the critical coating thickness.

Keywords: reduced graphene oxide, Pool boiling, nanoparticle deposition, transient characteristics.

1. Introduction

System miniaturization and high heat removal rate are the primary concern of any heat transfer devices and hence, a lot of investigations are carried out in this field for the last two

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