

عنوان مقاله:

CFD Modeling of Experimental Observations for Convective Heat Transfer Augmentation by High Frequency Ultrasonic Vibrations

محل انتشار:

پنجمین کنفرانس ملی کاربرد CFD در صنایع شیمیایی و نفت (سال: 1393)

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خلاصه مقاله:

The results of numerical study on the effect of high frequency ultrasound waves on convective heat transfer rate has been reported in this paper. A flat plate heater submerged in water, was exposed to a 1.7 MHz piezoelectric transducer and the average temperature of the plate surface was measured in the absence and presence of ultrasound waves. The experimental observations showed that the 1.7 MHz waves caused the effective cooling and can drop the temperature of the heater surface significantly. In order to understand the mechanism, the experimental conditions inside the water pool with and without ultrasonic vibration were numerically investigated. A commercial CFD package, FLUENT V.6.2, was used in this study. The fluid flow patterns and the plate temperature were predicted by CFD. The CFD predicted results were in good agreements with the experimental observations

کلمات کلیدی:

heat transfer enhancement, convection, high frequency ultrasound, CFD modeling, acoustic streams, temperature drop, flow pattern

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