Patent Search

Invention Title	Enhanced Heat Transfer System Using Circular and Oblique Liquid Jet Impingement with Nanofluid Optimization
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Abstract:

[001]Abstract: The invention relates to a novel method and apparatus for improving heat transfer through impinging liquid jets, especially using nanofluid mixtures a jet inclinations. It explores the impact of jet spacing, surface roughness, jet inclination angle, and nanofluid concentrations to enhance local and average convective h coefficients on heated surfaces. Experimental studies show up to 50% improvement in heat transfer with optimized nanofluid usage and setup. The system is applica industrial cooling, electronic devices, robotics, and cryogenic applications.

Complete Specification

DESC:Description of Related Art

[003] Existing impingement systems use water or conventional fluids, with limited enhancement potential. Prior studies mostly focus on jet spacing and nozzle dian However, few systems combine surface modification (roughness), nanofluid enhancement, and angular impingement. This invention addresses the gap by providin comprehensive multi-parameter optimization for effective localized cooling.

,CLAIMS:1. A heat transfer system comprising a jet impingement unit with normal and oblique nozzles delivering nanofluid to a heated surface.

2. The system of claim 1, wherein the nozzle-to-surface distance (Z) is optimized at a ratio of 6:1 with respect to nozzle diameter (d).

3. The system of claim 1, wherein the nanofluid contains nanoparticles in concentrations between 0.1% and 0.2%.

4. The system of claim 1, wherein the surface roughness of the target plate is between 8 and 10 µm for optimal heat transfer.

5. A method of enhancing heat transfer using jet impingement involving the steps of: Directing a nanofluid jet onto a heated surface; Adjusting jet inclination betv and 30°; varying jet flow rate and measuring local temperatures to calculate convective heat transfer coefficient.

6. The method of claim 5, wherein the temperature is measured at multiple points using thermocouples and compared across varying flow rates and roughness g

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