

Heat Transfer Enhancement Using Copper Metallic Foam during Convective Boiling in a Plate Heat Exchanger

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Abstract : The present work deals with the study of the heat transfer in a rectangular channel equipped with a metallic foam. The tested metallic foam sample is made from copper with 20 PPI (Pore per Inch Linear) and 93% of porosity and the working fluid used is the n-pentane. In the present work the independent variables are the velocity in the range from 0.02 to 0.06 m/s and a boiling heat flux rate varying between 30 and 70 kW/m². The heat transfer coefficient is presented versus boiling heat flux, vapor quality and superheat ΔT_{sat} . The thermal results are compared to those found for a plain tube for the same conditions. The comparison with the plain tube shows that the insert of a metallic foam enhances the heat transfer coefficient by a factor between 1.3 and 3.

Keywords : boiling, metallic foam, heat transfer, plate heat exchanger

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