

عنوان مقاله:

Computational fluid dynamics analysis of heat transfer in oscillating flow through a channel filled with metal foam

محل انتشار:

هفتمین کنگره ملی مهندسی شیمی (سال: 1390)

تعداد صفحات اصل مقاله: 9

نویسندگان:

Mohsen Ghafarian

Davod Mohebbi-Kalhari - *Corresponding Author Address: Assistant Professor of Chemical Engineering Department, University of Sistan and Baluchestan, Zahedan, Iran, P.O. Box 98164-161*

Jafar Sadegi

خلاصه مقاله:

A computational fluid dynamics analysis of forced convective heat transfer has been conducted numerically on the heat transfer of oscillating flow through a channel filled with metal foams subjected to a constant copper plate heat flux. The flow field and heat transfer were modeled using the Darcy-Brinkman-Forchheimer and corresponding energy equations. The surface temperature distribution on heated plate and local Nusselt number were calculated. The effect of amplitude and frequency of oscillating flow on heat transfer in porous channel were analyzed. The results of numerical analysis showed significantly enhancement in heat transfer by inserting metal foam in channel on heated plate. Furthermore, local Nusselt number increases with employing high amplitude and frequency of oscillating air flow. Effect of thermal conductivity of metal foam and Reynolds number were also numerically analyzed. Results showed that an increase in thermal conductivity of metal foam and Reynolds number can significantly increase the heat transfer. It is revealed that the proposed numerical model can efficiently provide useful information for the design of metal foam filled heat sinks with oscillatory inlet flow.

کلمات کلیدی:

Heat transfer; Oscillating flow; Oscillatory frequency and amplitude; metal foam; Numerical modeling

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/340963>

