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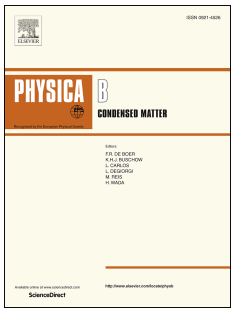

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The numerical Modeling of water/ FMWCNT Nanofluid Flow and Heat Transfer in a Backward-Facing Contracting Channel

Abdullah A.A.A. Alrashed[1], Omid Ali Akbari[2], Ali Heydari[2], Davood Toghraie [3], Majid Zarringhalam[4], Gholamreza Ahmadi Sheikh Shabani[2], Ali Reza Seifi[2] and Marjan Goodarzi[5,6,*]

[1]Department of Automotive and Marine Engineering Technology, College of Technological Studies, The Public Authority for Applied Education and Training, Kuwait
[2]Young Researchers and Elite Club, Khomeinishahr Branch, Islamic Azad University, Khomeinishahr, Iran.
[3]Department of Mechanical Engineering, Khomeinishahr Branch, Islamic Azad University, Khomeinishahr,.
[4]Young Researchers and Elite Club, South Tehran Branch, Islamic Azad University, Tehran, Iran.

[5]Sustainable Management of Natural Resources and Environment Research Group (SREM), Ton Duc Thang University, Ho Chi Minh City, Vietnam.
[6]Faculty of Environment and Labour Safety, Ton Duc Thang University, Ho Chi Minh City, Vietnam.
[*]Corresponding author. +60 (11) 143 54102; fax: +60 (122) 639 654.

E-mail address: marjan.goodarzi@tdt.edu.vn

Abstract

In recent years, the study of rheological behavior and heat transfer of nanofluids in the industrial equipment has become widespread among the researchers and their results have led to great advancements in this field. In present study, the laminar flow and heat transfer of water/functional multi-walled carbon nanotube nanofluid have been numerically investigated in weight percentages of 0.00, 0.12 and 0.25 and Reynolds numbers of 1 to 150 by using finite volume method (FVM). The analyzed geometry is a two-dimensional backward-facing contracting channel and the effects of various weight percentages and Reynolds numbers have been studied in the supposed geometry. The results have been interpreted as the figures of Nusselt number, friction coefficient, pressure drop, velocity contours and static temperature. The results of this research indicate that, the enhancement of Reynolds number or weight percentage of nanoparticles causes the reduction of surface temperature and the enhancement of heat transfer coefficient. By increasing Reynolds number, the axial velocity enhances, causing the enhancement of momentum. By increasing fluid momentum at the beginning of channel, especially in areas close to the upper wall, the axial velocity reduces and the possibility of vortex generation increases. The mentioned behavior causes a great enhancement in velocity gradients and pressure drop at the inlet of channel. Also, in these