

عنوان مقاله:

Nanoparticle addition and path-curvature-effect on heat transfer in a typical conical spiral duct with a square cross-section

محل انتشار:

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خلاصه مقاله:

A comprehensive study was conducted on how different nano-fluids affect the heat transfer characteristics of a conical spiral duct with a square section. Metallic, non-metallic and Carbon nanotube (CNT) nanoparticles were assumed to be added to water as coolant in the spiral side of heat exchangers. The combined effects of nanoparticle dispersion and path curvature on heat transfer enhancement under two different thermal boundary conditions were investigated. The effects of the flow regime on heat transfer in such a configuration were tested. The flow and energy equations were solved numerically using available commercial software ANSYS FLUENT® Academic Research, Release ۱۶.۲. The numerical procedures were verified with available data, and correlation and maximum error were determined to be less than ۱۳%. It was found that compared to the non- curved duct with the same length; heat transfer would increase by about ۱۵%. The addition of metallic nanoparticles also enhanced the heat transfer by ۵%. In low Reynolds numbers, crossflow affects temperature distribution and thermal characteristics but in the turbulent regime, the temperature distribution is less sensitive to generated crossflow.

کلمات کلیدی:

Nanofluids, Heat exchangers, Conical Spiral Ducts, Numerical Heat Transfer

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