

Title:

Magnetic field effect on the nanofluids convective heat transfer and pressure drop in the spirally coiled tubes

Journal:

International Journal of Heat and Mass Transfer, Volume 110, 2017.

Document Type:

Article

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Full text link:

Publisher :

https://www.researchgate.net/publication/360984663_Rheological_and_Mechanical_Properties_of_Polyisobutylene_Filled_with_Nanosilica_Zinc_Oxide_and_Titanium_Oxide

Scopus preview:

<https://www.scopus.com/record/display.uri?eid=2-s2.0-85016435922&doi=10.1016%2fj.ijheatmasstransfer.2017.03.077&origin=inward&txGid=78f93f597fc303bee9a535d4e540929c>

Abstract:

The experimental study has been performed on the convective nanofluids heat transfer characteristics and pressure drop in the spirally coiled tubes under the magnetic fields effect. The nanofluids flows into the spirally coiled tube at the innermost coiled turn and flows along the constant tube wall temperature and then flows out the test section at the outermost coiled turn. Three different magnetic fields strength of 0.12, 0.18, 0.23 μT are generated by the permanent external magnets. Effects of curvature ratios, nanofluids concentration and magnetic fields strength on the heat transfer and pressure drop are discussed. The obtained results are compared with the experiment without magnetic field under same condition which shows that the magnetic field effect increases the Nusselt number up to 16.97%, 25.83%, 31.15% for the magnetic fields strength of 0.12, 0.18, 0.23 μT , respectively. However, the enhancement of the pressure drop is slightly significant for under the magnetic field effect.