AUGMENTATION OF HEAT TRANSFER IN A MICROTUBE AND A WAVY MICROCHANNEL USING HYBRID NANOFLUID: A NUMERICAL INVESTIGATION

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Abstract

The paper discusses the numerical investigation involving forced convective heat transfer (HT) in the laminar flow regime is carried out for nanofluid (NF) and hybrid nanofluid (HNF) in a microtube and wavy microchannel. Water-based Al2O3 nanofluid and water-based Al2O3-Ag hybrid nanofluid is studied for this purpose. Reynolds Number (Re), temperature, volume fraction, and nanoparticle (NP) size are varied for the analysis at a constant heat transfer rate. Numerical results characterizing the performances of nanofluid and hybrid nanofluid are presented in terms of the local heat transfer coefficient. It is found that with the increase in Reynolds number, volume fraction and temperature, local heat transfer coefficient is increased. Comparison of nanofluid and hybrid nanofluid reveals superior heat transfer property of the later. However, microtube exhibits better heat transfer coefficient than the wavy channel at constant heat flux, length and area.

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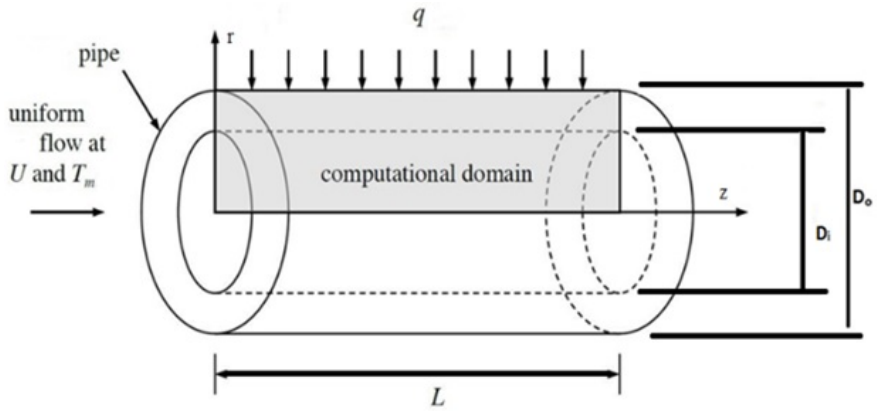

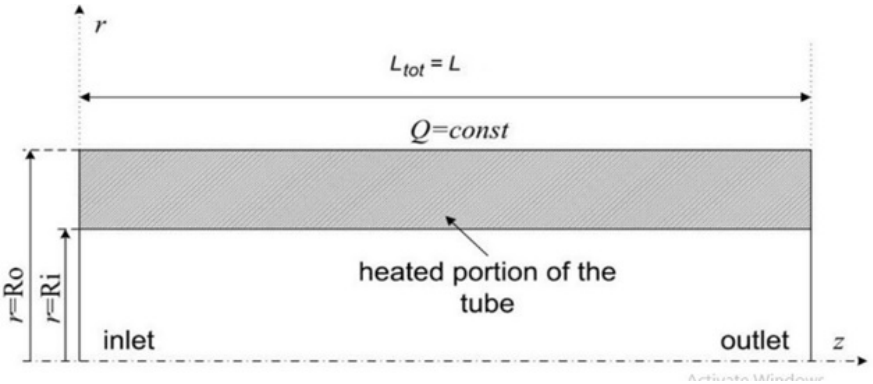

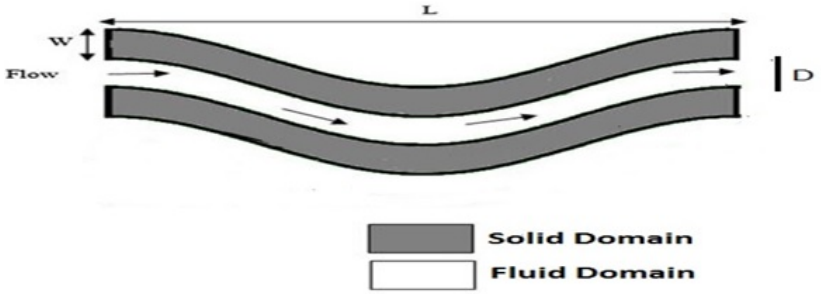

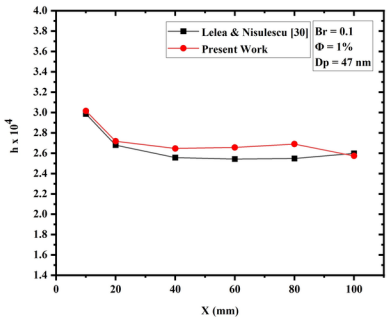

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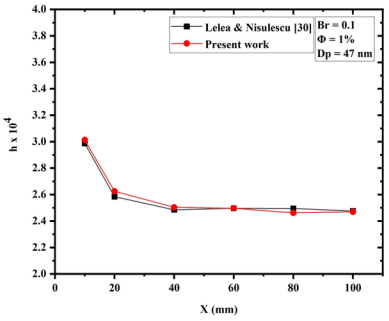

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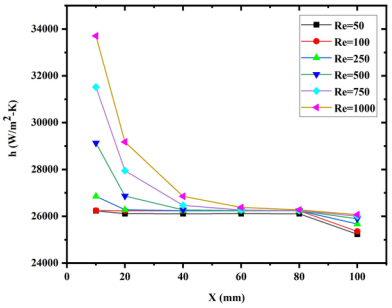

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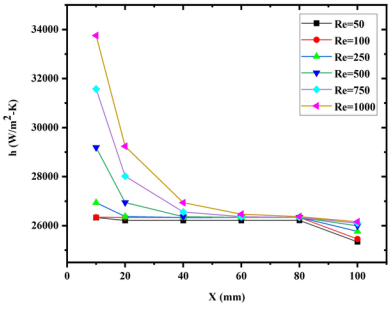

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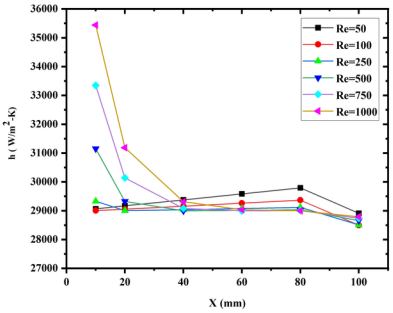

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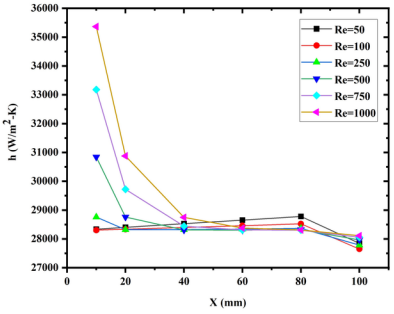

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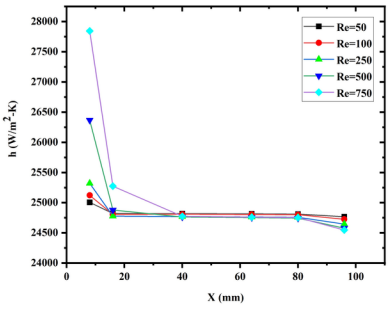

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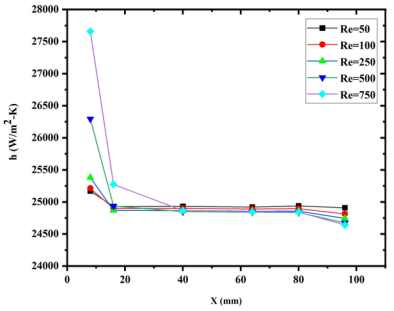

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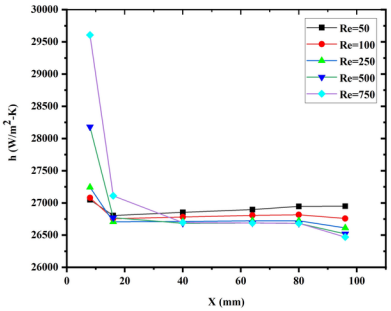

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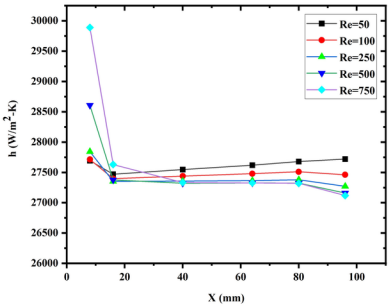

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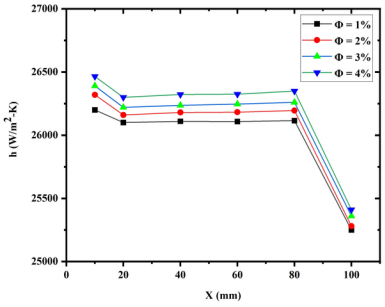

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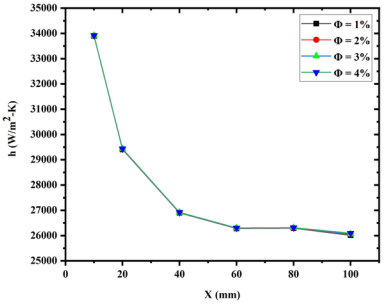

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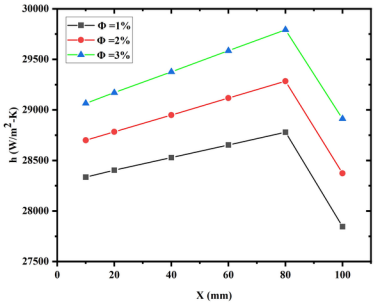

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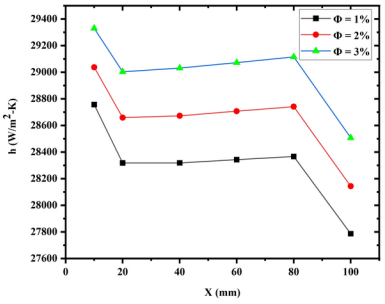

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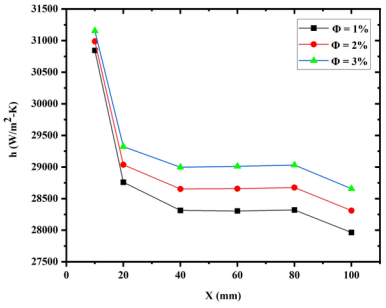

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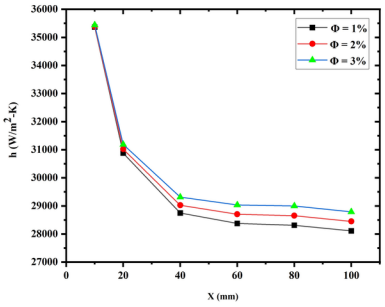

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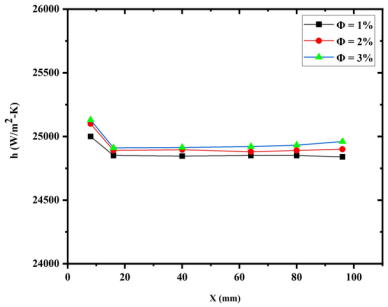

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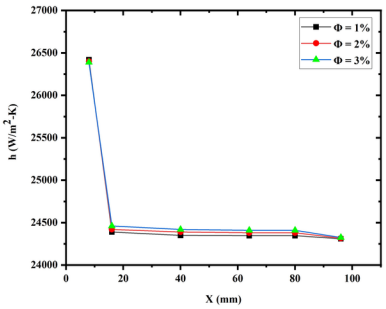

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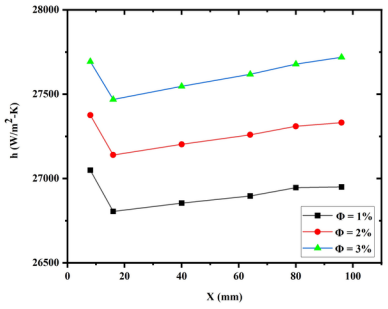

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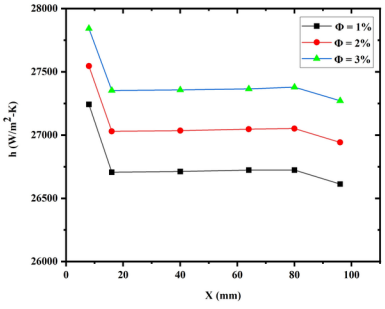

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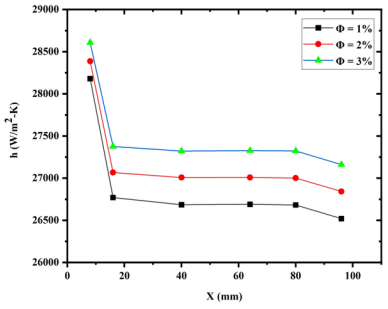

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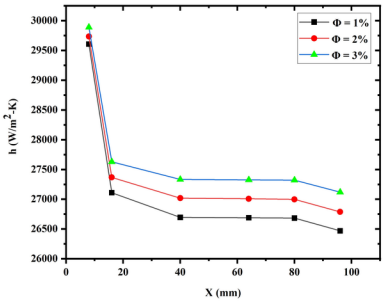

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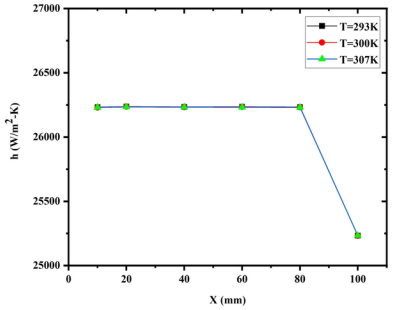

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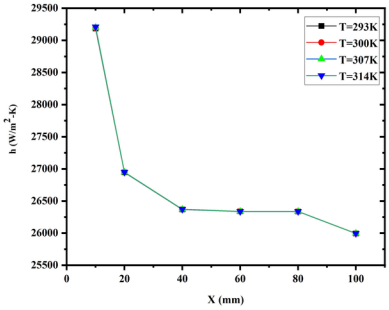

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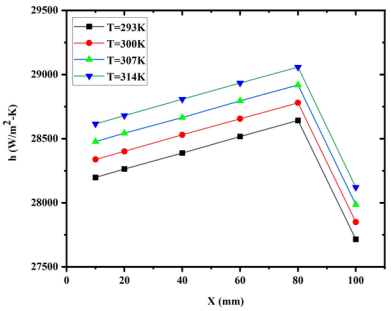

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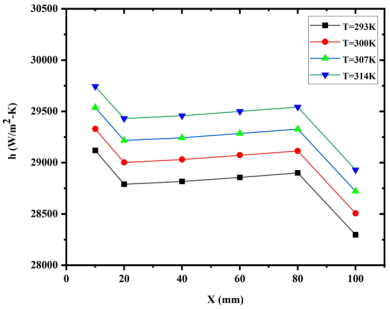

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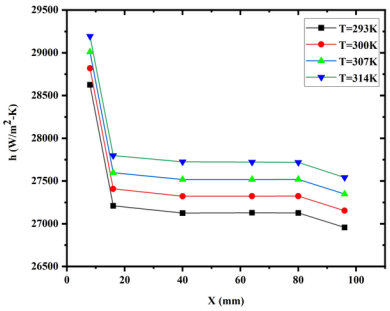

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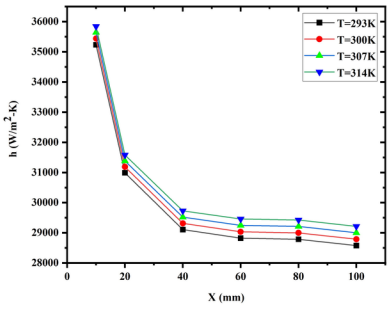

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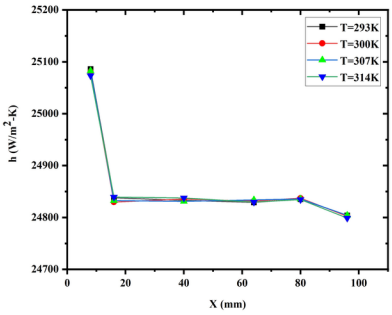

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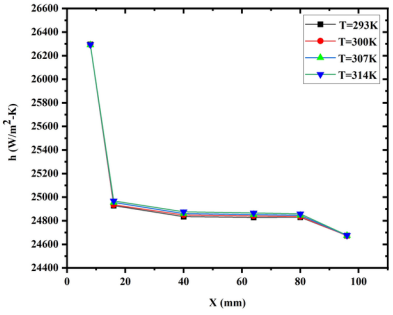

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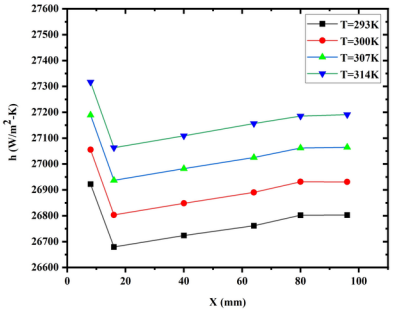

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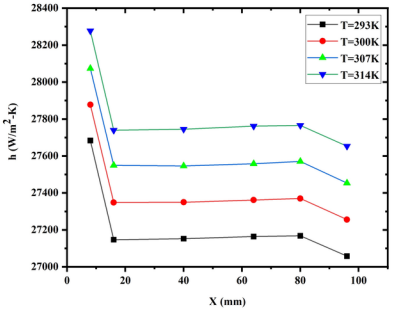

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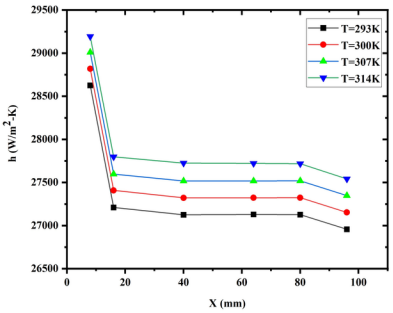

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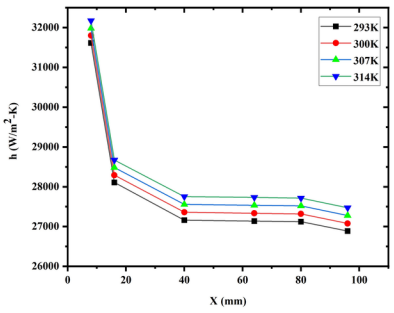

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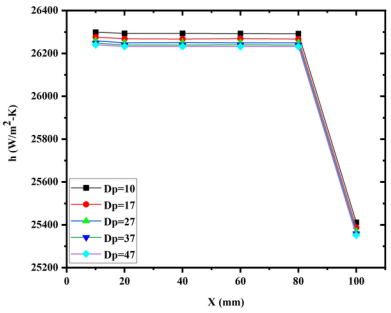

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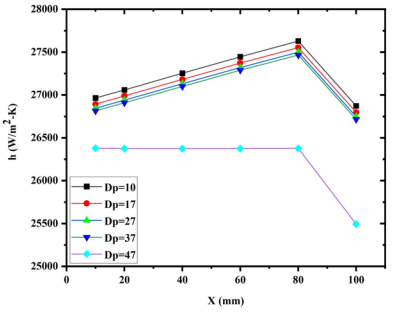

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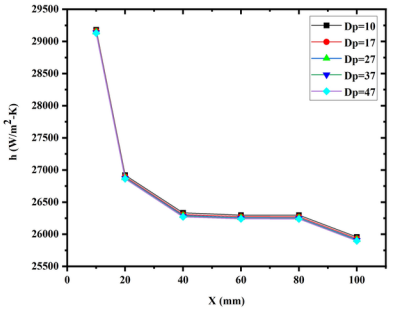

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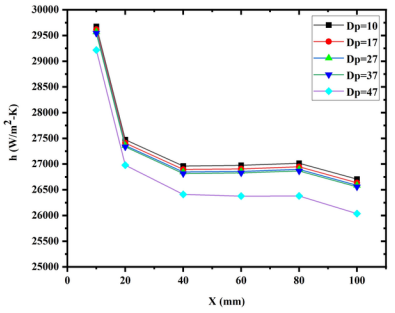

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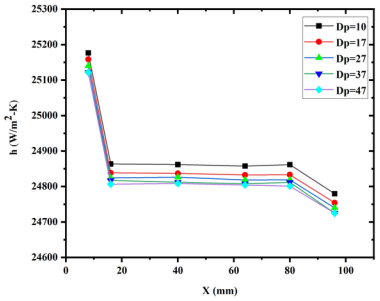

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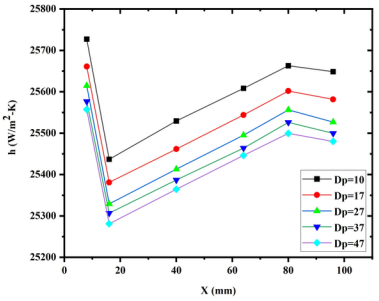

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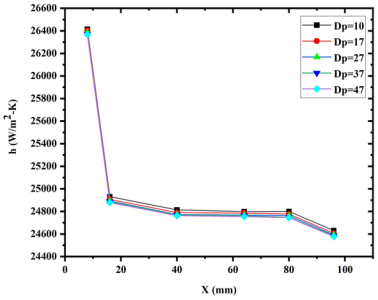

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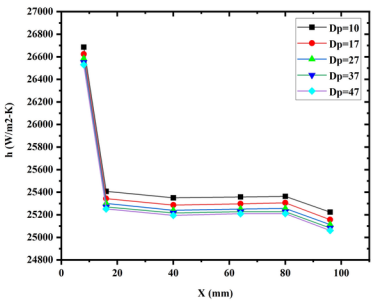

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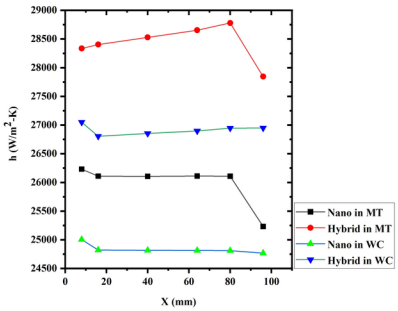

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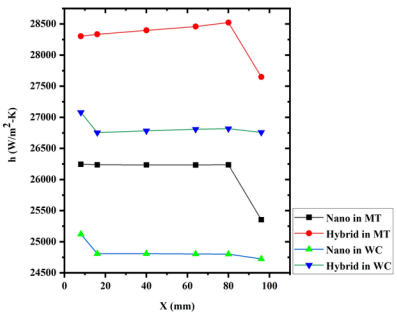

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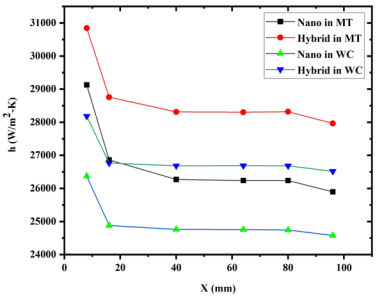

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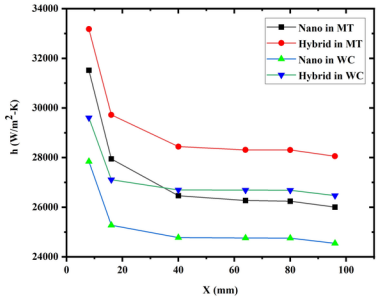

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