ELUCIDATION AND MODEL DEVELOPMENT OF THERMAL CONDUCTIVITY ANALYSIS FOR CELLULOSE NANOCRYSTAL (CNC) BASED NANOFLUID

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Introduction

Enrichment of heat transfer rate will be useful in various engineering application. According to Fourier's Law of Conduction, thermal conductivity has proportional relation with heat transfer rate. Most of the conventional thermal transport fluid has low thermal conductivity value which is not sufficient for massive heat removal. Since then, nanofluid becomes a promising remedy to produce thermal transport fluid which has ability to remove high thermal energy. The evolutionary of nanosubstance begins with usage of nanoparticle such as TiO_2, SiO_2 and Al_2O_3.

Cellulose Nanocrystal (CNC) is a nano-scaled fibril that is extracted from plant. It is a renewable material which is also biodegradable. It leads to a green environment products. In this paper, thermal conductivity of CNC weight concentration of 7.4% dispersed in ethylene glycol-water mixture at 40:60 ratio is determined experimentally. Hence, effective thermal conductivity model is proposed by using statistical analytical tool, Minitab 17.