An overview of vapor compression refrigeration system performance enhancement mechanism by utilizing nanolubricants

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ABSTRACT

Nanolubricants are dispersed nano-scales solid particles in a base fluid. Due to high demand for higher efficiency in thermal application systems, nanolubricants is an ideal option to meet the particular demand. As the result a numerous scientist have been investigating to replace the base fluid in the vapor compression refrigeration (VCR) system with nanolubricants. This paper elaborates the major factors that influence the VCR system performance mechanism through thermal conductivity enhancement, solubility and homogenous solution, stability, viscosity and tribological improvement of nanolubricants, respectively. The two common methods in preparing nanolubricants are one-step and two-step method which have been discussed in this paper. The current development of nanolubricants and hybrid nanolubricants have been elaborated. The findings show that the viscosity and thermal conductivity escalated with the improved of nanolubricants volume concentration. The studies revealed that introducing nanoparticles into lubricant has a major effect in improving viscosity, thermal conductivity and tribological improvement that led to the improvement of heat transfer enhancement mechanism.

KEYWORDS: Nanolubricants, Thermal conductivity, Vapor compression refrigeration (VCR) system, Performance enhancement

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