물-TiO_2 나노유체 풀비등에서의 임계열유속 증가에 미치는 나노입자의 영향

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Effect of Nanoparticles on CHF Enhancement in Pool Boiling of Water-TiO_2 Nano-Fluids

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Key Words: 『Nano-fluids(나노유체)』 『Nanoparticle surface coating(나노입자 표면 코팅)』 『Pool boiling critical heat flux(풀비등 임계열유속)』

Abstract : To study the characteristics of CHF (Critical Heat Flux) of nano-fluids, pool boiling CHF experiments of water-TiO2 nano-fluids were performed with different volume concentrations of titania nanoparticles. The results showed that nano-fluids significantly enhanced CHF compared to pure water. And it was found that nanoparticles were coated on heating surface during pool boiling of nano-fluids. After that, pool boiling CHF of pure water was measured using a nanoparticle-coated heater prepared by pool boiling of nano-fluids on a bare heater. The results showed that CHF enhancement in pool boiling of nano-fluids is mainly caused by the nanoparticle coating of the heating surface.

통신용 광모듈의 열설계

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Thermal Design of Integrated Optical Module for Communication

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Key Words: Optical module(광모듈), TOSA, Thermal design(열적설계), heat dissipation(열소산), thermal resistance(열저항)

Abstract : In an optical module with high density and small size, it is important to maintain the operating temperature by an adequate heat dissipation. The thermal simulation of an optical module for communication has been performed to reduce the operating temperature of optical module. To improve the behavior of heat dissipation, we have simulated heat path and heat resistance using commercial code, FEMLAB. We have chosen factors which include the thickness, thermal conductivity, interface area and surface roughness of the heat sink and submount as an element of heat resistance. To reduce heat resistance, it was desirable to use thematerial of higher thermal conductivity and to fill the thermal conductive material between the interfaces. We have proposed that the operating temperature of an optical module could lower about 10 degrees by controlling the above factors.