

NO₂ 마이크로 가스센서의 열적성능에 관한 연구

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A Study of Thermal Performances for NO₂ Micro Gas Sensor

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Key Words: gas sensor(가스센서), heat transfer(열전달), MEMS, NO₂(이산화질소), numerical analysis(수치해석).

Abstract : A lever type NO₂ micro gas sensor was fabricated by MEMS technology. In order to heat up the gas sensing material to a target temperature, a micro heater was built on the gas sensor. The sensing material laid on the heater and electrodes and did not contact with the silicon base to minimize the heat loss to the silicon base. The electric power to heat up the gas sensor to a target temperature was measured. The temperature distribution of micro gas sensor was analyzed by a CFD program. The predicted electric power of micro heater to heat up the sensing material to the target temperature showed a good agreement with the measured data. The design of micro gas sensor could be modified to show more uniform temperature distribution and to consume less electric power by optimizing the layout of micro heater and electrodes.

초임계압 CO₂의 수직상향유동에서 열전달계수

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Heat Transfer Coefficient in Vertical Upward Flow of Supercritical Pressure CO₂

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Key Words: supercritical pressure(초임계압), heat transfer coefficient(열전달계수)

Abstract : SCWR (SuperCritical Water-cooled Reactor) is a feasible option for the 4th generation nuclear power plant. The main advantage of SCWR is very high thermal efficiency. A proper design requires a good description of heat transfer characteristics in relevant geometries and operating conditions. A recently built supercritical pressure test facility in KAERI has been used in producing experimental data on heat transfer and pressure drop in a flow of supercritical pressure CO₂ in geometries relevant to a proposed SCWR core. Currently, heat transfer experiment with a small diameter circular tube is being executed. The test result is introduced and compared with correlations published previously.