

냉동시스템 및 열유체 연구실



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❖ Delegate, Assembly for Int. Heat Transfer Conference

❖ Scientific Council, International Center for Heat and Mass Transfer

❖ Executive Board, Asian Union Thermal Science and Engineering

❖ Editor-in-Chief, Int. J. of Air-Conditioning and Refrigeration

❖ Editor, Computational Thermal Sciences: An International Journal

주요 연구 분야

1. 열전달 성능향상 및 2상-유동

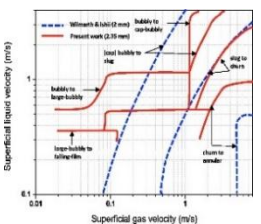
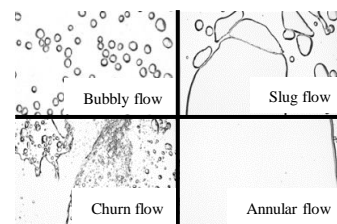
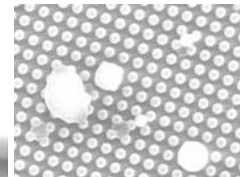
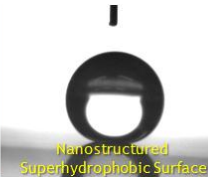
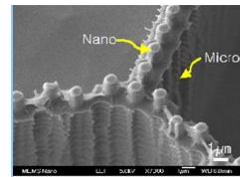
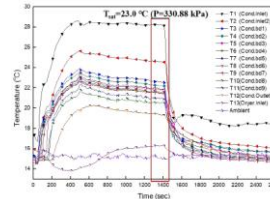
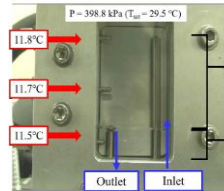
- 열전달 촉진, 증발/응축 상변화 열전달
- 2상-유동의 유동양식 평가
- 동물 호흡기의 열/물질 전달 해석

2. 냉동 및 열교환기 시스템 개발

- 냉매 열물성 및 열전달
- 냉동/히트펌프 시스템 해석 및 설계
- 고성능/고효율 열교환기 설계기술

3. 원자력 발전소 안전

- 원자력 발전소 안전 해석



Refrigeration & Heat Pump Systems

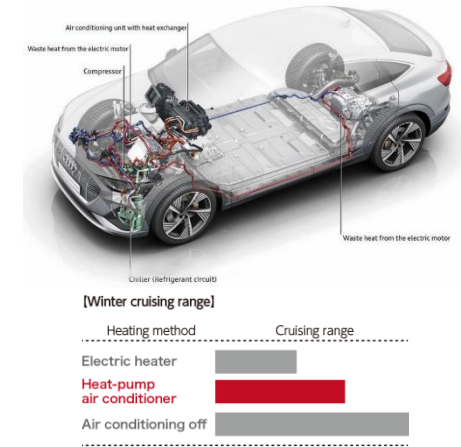
● 의료/식품용 냉동 시스템



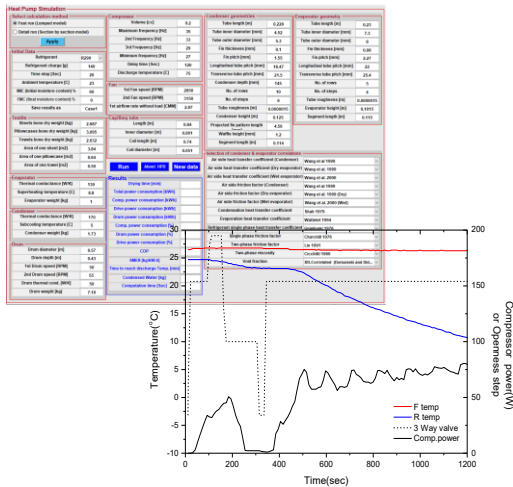
● 빌딩 공조용 heat pump



● 전기자동차용 heat pump



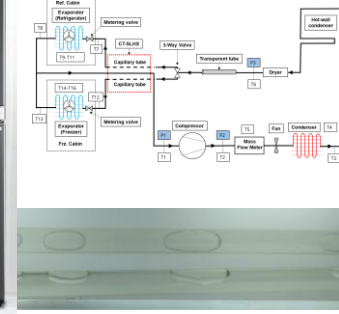
● 냉동시스템 시뮬레이션



● 히트펌프 건조기 모델개발



● 냉장고 에너지효율 개선



Two-Phase Flow & Phase Change Heat Transfer

● 소수성 표면 및 액적응축 구현

(a) 1.5 μ m, 1:1 ratio



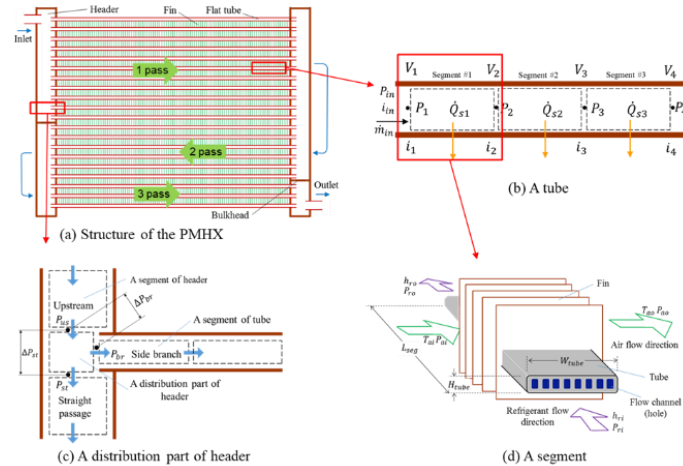
38.44 kW/m² 42.18 kW/m² 56.09 kW/m²

(b) 1.5 μ m, 1:2 ratio

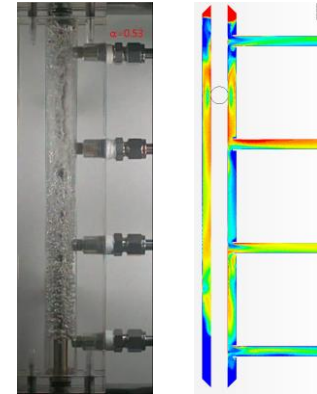


39.41 kW/m² 41.18 kW/m² 56.96 kW/m²

● HEX 2상 유동 분배

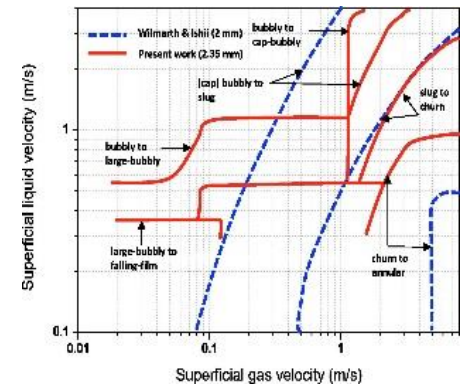
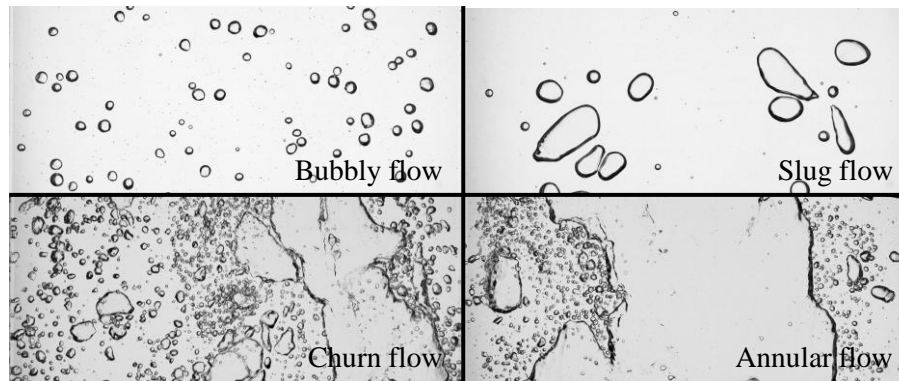
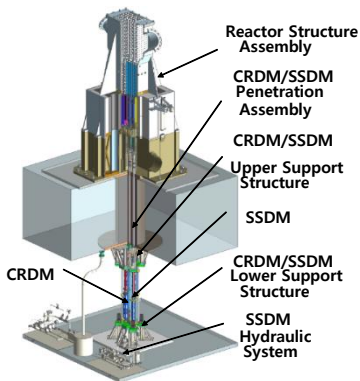


● 2상 유동 분배



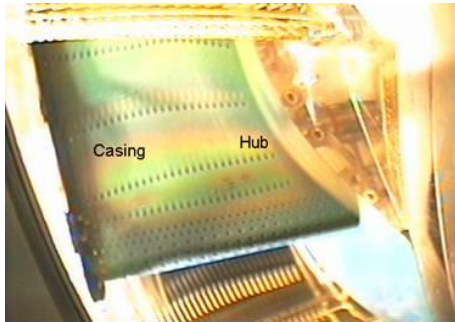
● 연구용 원자로 판형핵연료 유로의 수력학적 특성 연구

- 사각유로의 유동양식 평가 및 기존 사각유로의 2상-유동모델 개선

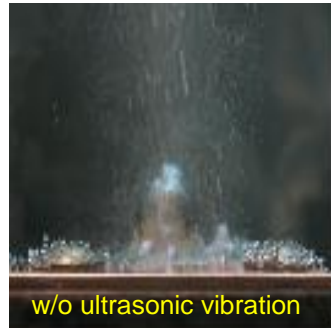


Heat Transfer Enhancement Technology

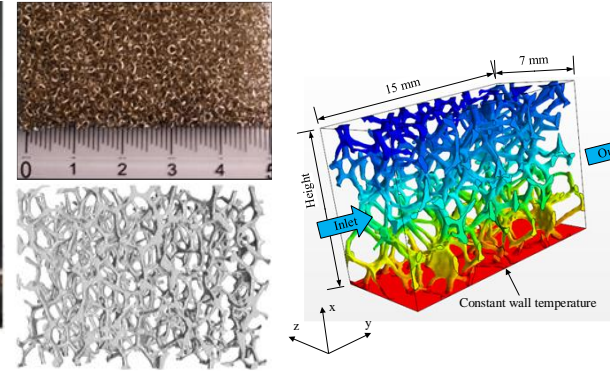
- NGV film cooling



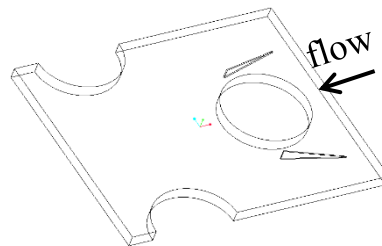
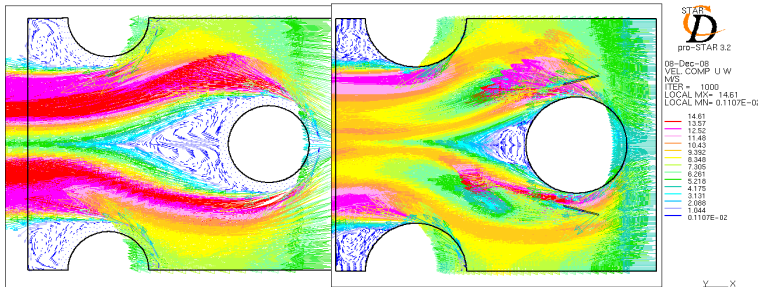
- 초음파 이용 증발열전달 촉진



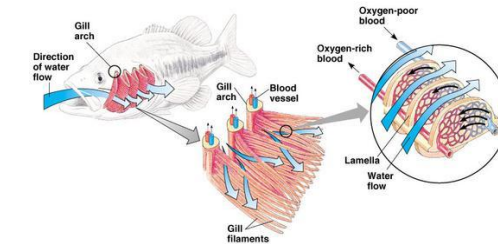
- Porous metal



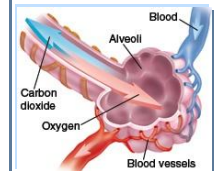
- Vortex generator



- 동물 호흡기 모사한 열전달 기구 개발

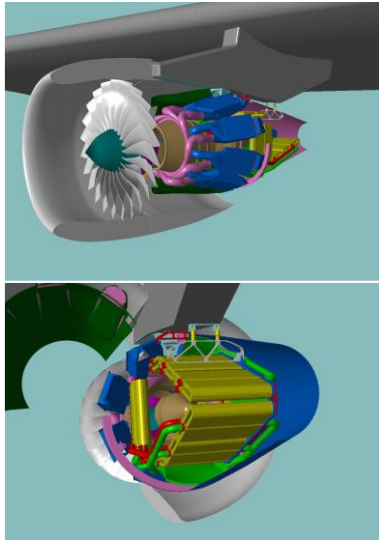


$$\frac{St}{St_m} = \left(\frac{Sc}{Pr}\right)^{2/3} \Rightarrow \frac{h}{h_m} = \rho C_p \left(\frac{Sc}{Pr}\right)^{2/3}$$



Compact Heat Exchangers

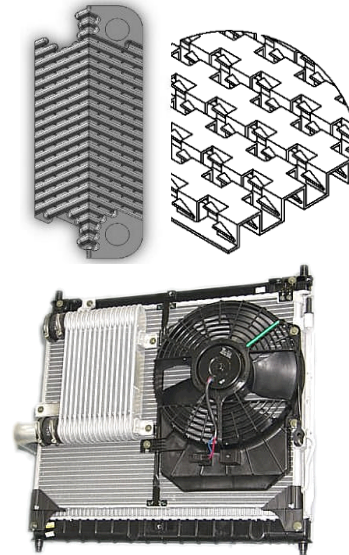
- 항공기 HEX



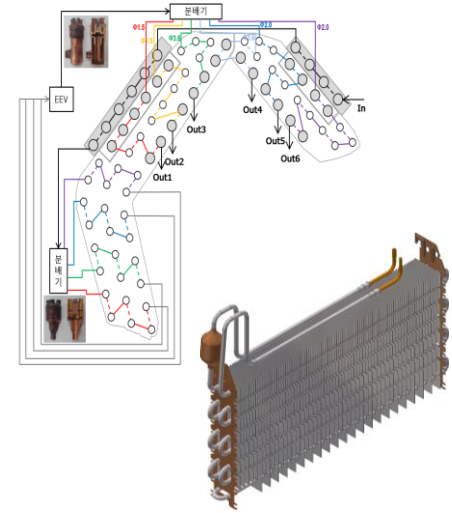
- 원자력발전소 HEX



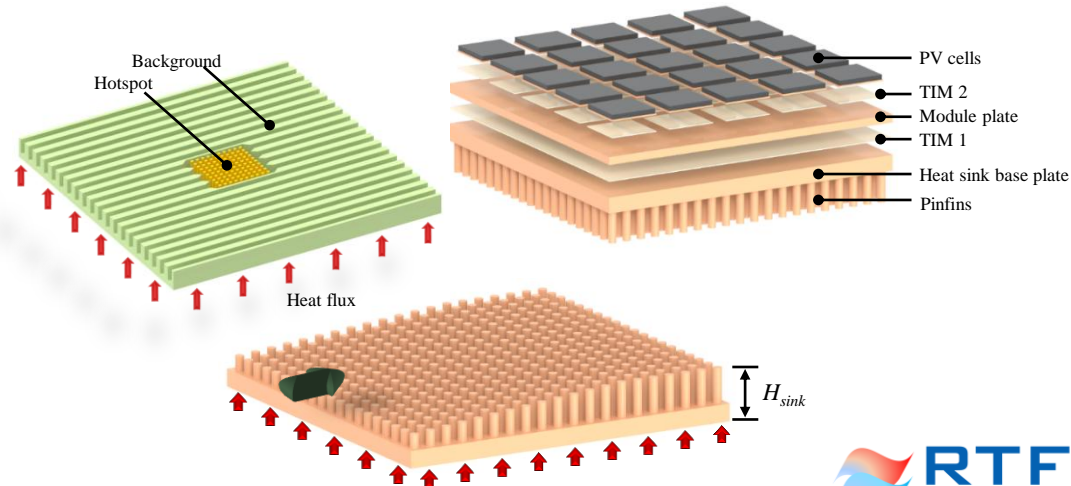
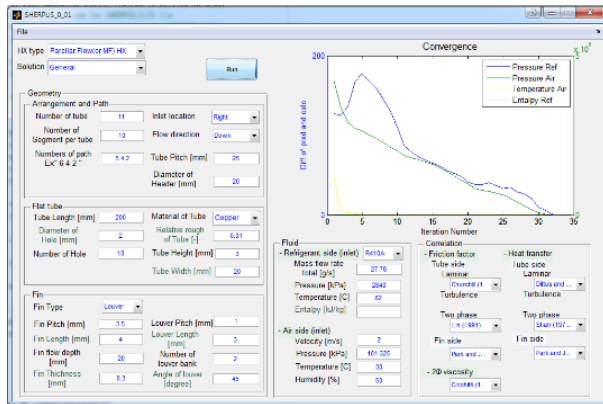
- 전기차 HEX



- 에어컨/냉장고 HEX

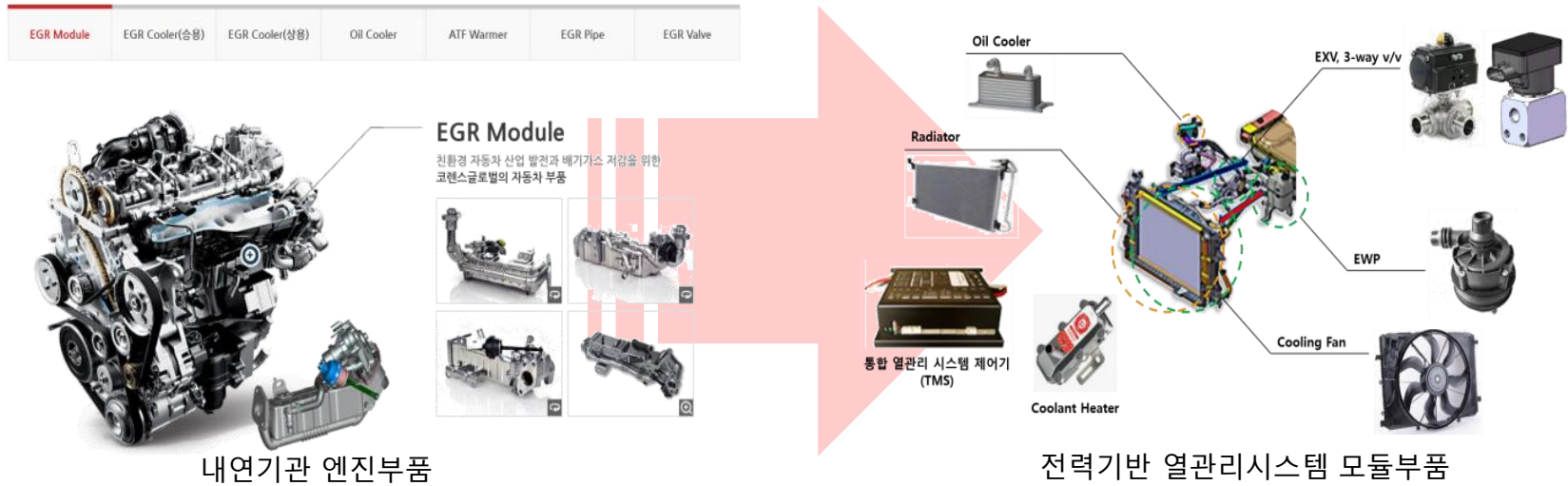


- 열교환기 S/W (판형, 환관, 마이크로채널) ● Pin fins for hot spot management

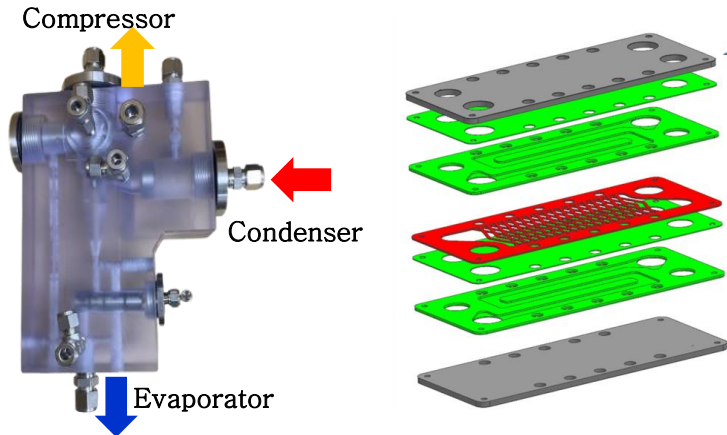


Thermal Management of EV

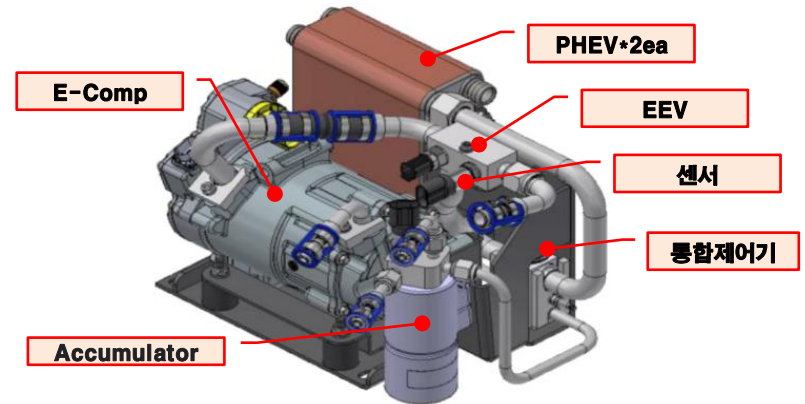
- Thermal management system of electric vehicle



- Components: EEV, PHEX

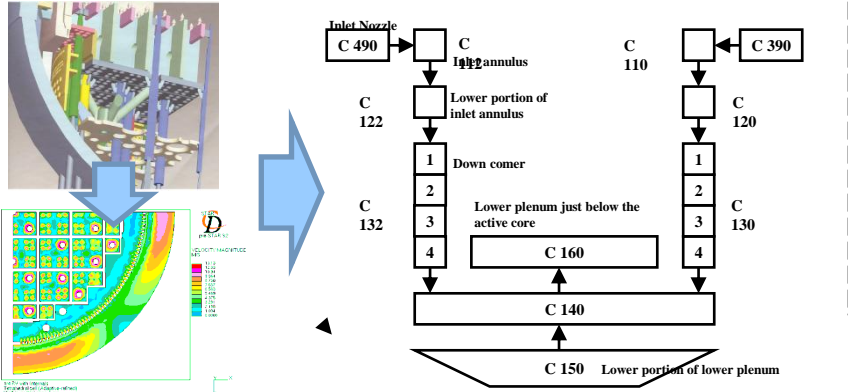


- TMS Module for EV Platform (CO₂, R290)

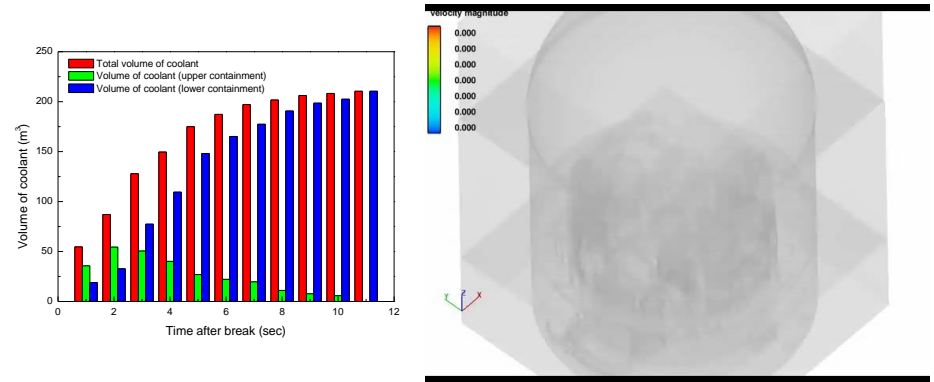


Nuclear Power Plant Safety

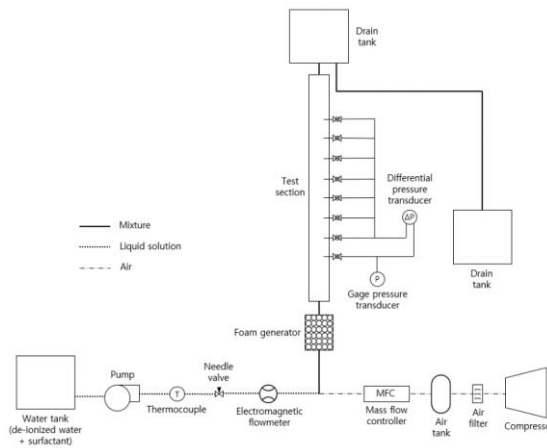
● CFD를 이용한 PWR 압력 손실 계수 평가



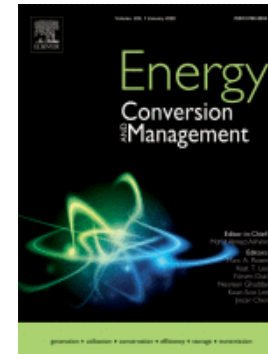
● CFD를 이용한 대형배관 파단 방출유량 평가



● 원전폐로시 제염위한 거품유동 유동 모델개발

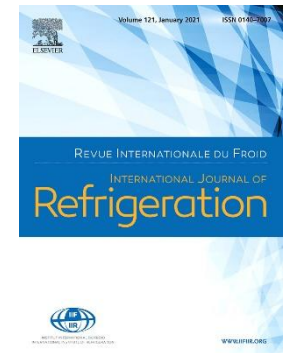
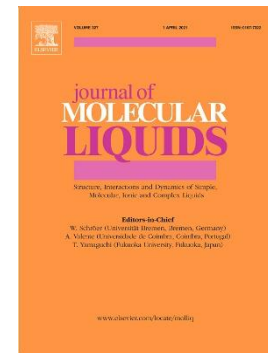
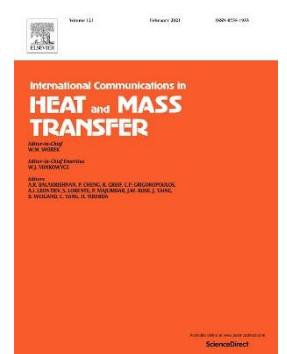
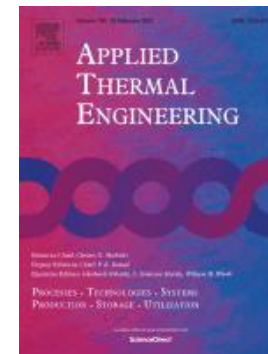


학술 활동



◆ 3년간 게재된 저널 (SCI)

- 냉동분야 최고 권위 저널 : 3편
- 에너지 분야 상위 10% : 14편
- 화학 및 물리학 분야 상위 10% : 1편



대학원생 교외 활동



졸업 후 진로



구성원

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- Post-Doc. : 1명
- 학생 :
 - 박사과정 : 5 명
 - 석사과정 : 9 명
 - 교환학생 : 1 명
 - 학부연구생 : 3 명



Welcome RTF

◆ 최근 5년간 졸업생 취업 현황

- 대학교수 : 2명
- 국공립 연구소 : 1명
- 공기업 : 1명
- 대기업 : LG전자 (8), 현대자동차 (2), 현대로템 (1),
삼성전자 (1), SK매직 (1), 대우건설 (1)
- 외국계 : 1명

◆ 전체 졸업생 취업 현황

- 원자력 및 방산 계열
KAERI (한국원자력연구원), KHNP-CRI 및 KHNP (한국수력원자력 중앙연구소 및 한국수력원자력), KINS (한국원자력안전기술원), KNFC (한전원자력연료), KITECH (생산기술연구원), DTAQ (국방기술품질원), 한화에어로스페이스, 현대로템 등
- 냉동 시스템 계열
대학, LG전자, 삼성전자, SK매직, 한온시스템, 경동나비엔, 대우건설, 르노삼성 자동차, 현대차, 현대차 북경 등