

〈 영국 측 공동연구실 소개 자료 〉

한국 연구책임자	소속/연구실명	경북대학교/에너지환경시스템공학연구실
	성명	이대성
영국 연구책임자	소속/연구실명	U. of Reading/유기화학연구실
	성명	Prof. Laurence Harwood
	소속/연구실명	U. of Central Lancashire
	성명	Prof. Gary Bond/ Harry Eccles

■ 한국 연구실 소개

연구책임자 소개
<p>○ 경북대학교 이대성 교수</p> <p><u>Professor Dae Sung Lee</u> (Project P-I) is the Professor in Environmental Engineering at Kyungpook National University. He has been a visiting professor at Department of Chemical Engineering and Biotechnology in Cambridge University in 2012. He has been working in the area of nanostructured materials and decontamination and decommissioning technology since 1997. He is recognised internationally for his nano science expertise that includes ecotoxicity, environmental application and process systems engineering. He has published more than 130 scientific papers and inventor/co-inventor of more than 10 patents related to treatment of radioactive waste and synthesis of nanostructured materials.</p> <p>○ 경북대학교 최상준 교수</p> <p><u>Professor Sang June Choi</u> (Project Co-I) is the Professor in Environmental Engineering at Kyungpook National University and head of the centre for decontamination and decommissioning technology funded by the National Science Foundation since 2012. In early 1980s, he was a researcher in Korea Atomic Energy Research Institute. Since joining KNU he is developing new separation processes for treatment of radioactive waste. Recently, He developed a new ion exchanger to separate cesium and strontium from the radioactive waste at high NaCl concentration. He worked with the Korea nuclear power company in order to apply his new ion exchanger to treat a radioactive waste in nuclear power plant. His current projects are also focused on the decontamination of radioactive waste. He has published more than 30 scientific papers, and inventor/co-inventor of more than 10 patents related to treatment of radioactive waste.</p>

○ 조선대학교 송종순 교수

Professor Jongsoon Song (Project Co-I) is the Professor at the Department of Nuclear Engineering in Chosun University, Korea since 1989. He has been working in the area of radioactive waste management and nuclear fuel cycles including decontamination & decommissioning of nuclear power plant and had been a Vice President of Korean Radioactive Waste Society during 2011 - 2013. He also served as a Nuclear Program Director in KISTEP (Korea Institute of Science and Technology Evaluation and Planning) during 2002 – 2004. Also had been a Team Leader of National Task Force for Decontamination and Decommissioning in Korea under MOTIE (Ministry of Trade, Industry and Energy) and developed a 1st and 3rd Technology Roadmap for Radioactive Waste Management and Decontamination & Decommissioning in Korea as a Leader. He is currently doing several projects including Radioactive Source-term Evaluation for Decommissioning, Fukushima Site Soil Decontamination and Safety Assessment of Radioactive Waste from Decommissioning. And has published more than 50 research publications including conference proceedings and technical reports, and 2 books.

연구실 소개(주요 연구 분야, 보유 장비 등을 중심으로 기술)

경북대/조선대 연구진은 방사성폐기물 분석에 필요한 대부분의 장비(NMR spectroscopy, Mass spectroscopy, X Ray diffraction and scattering, Optical spectroscopy, Thermal analysis, Electron microscopy laboratory)를 보유하고 있음.

■ 영국 연구실 소개

연구책임자/연구진 소개

○ Prof. Laurence Harwood (University of Reading)

Professor Laurence Harwood (Project PI) a chemist by profession and Professor of Organic Chemistry at Reading since 1996, Regional Editor of Synlett since 2001 and Chief Scientific Officer of TechnoPep since 2010. He has been working in the area of reprocessing since 2004 and has been a member of the PARTNEW, ACCEPT and SACSESS (current) EU consortia, MBase and PACIFIC EPSRC consortia, with total research income for nuclear associated projects exceeding £800K. The CyMe4BTP, BTBP and PTPPhen ligands developed at Reading have become industry standards for selective minor actinide extraction from HLW. The recent immobilization

of these ligands onto magnetic nanoparticles has provided a revolutionary process applicable to soil remediation and also to clean-up of low level liquid waste and sludges in storage ponds, has published more than 140 refereed research publications; 10 patents; 9 review chapters; 4 books.

○ Prof. Gary Bond (University of Central Lancashire, UK)

Professor Gary Bond (Project Co-I) is Head of the Centre for Materials Science and has been a visiting professor at the CNRS (Centre National de la Recherche Scientifique) Laboratory for Catalysis and Spectroscopy in Caen (2007). His research is focused on interfacial phenomena and has a substantial experience in the analysis and characterisation of solid materials. He has particular expertise in the application of carbon substrates as adsorbents, supports and catalysts. He has secured over £2M research funding from industry and government agencies including the nuclear industry. His current portfolio of projects includes two projects which are focused on the decontamination of irradiated graphite. He has published over 40 refereed publications, contributed chapters to 3 books and is the co-inventor on one patent.

○ Prof. Harry Eccles (University of Central Lancashire, UK)

Professor Harry Eccles (Project Co-I) is the Professor in Nuclear Materials (part-time) and a chemist by profession with about 35 years research and development experience in the nuclear industry. He is recognised internationally for his separation science expertise that includes ion exchange, solvent extraction and biosorption. In the early 1970s he developed a chelate ion exchange material for the recovery of uranium from sea water. On joining BNFL in the mid 1970s he was involved in the development of U and Pu purification flowsheets for the THORP PUREX process. Since joining UCLan he is developing new separation processes for reprocessing irradiated fuel and for treatment of waste liquors. Also developing techniques for the decontamination of irradiated graphite and investigating the mobility of fission products within cement paste and their rate of diffusion from cement paste.

연구실 소개(주요 연구 분야, 보유 장비 등을 중심으로 기술)

Prof. Laurence Harwood는 U. of Reading의 기기분석실 (<http://www.reading.ac.uk/caf/about/caf-about.aspx>) 책임자로서 방사성폐기물 분석에 필요한 대부분의 장비(NMR spectroscopy, Mass spectroscopy, X Ray diffraction and scattering, Optical spectroscopy, Thermal analysis, Electron microscopy laboratory)를 보유하고 있으며, 방사성폐기물에 선택적으로 반응하는 리간드를 화학적으로 합성하는 연구를 수행하고 있음.

Prof. Harry Eccles는 영국 BNFL에서의 방사성폐기물 처리 실무 경험을 바탕으로 University of Central Lancashire에서 방사성폐기물 처리에 대한 연구를 수행하고 있음. 특히, 방사성 폐기물 핵종의 모니터링 및 용매추출, 이온교환, 생흡착에 기반한 방사성 폐기물 제거 연구에 주력함.

■ 한·영 공동연구 수행 내용

- 1차년도 : 자성 나노복합체의 합성 및 방사성 핵종의 선택적 분리 흡착 메카니즘 규명
 - 핵사시아노철산염을 이용한 자성을 띠는 하이브리드 나노복합체 합성
 - XRD, TGA, FTIR, SEM, TEM 등에 기반한 자성 하이브리드 나노복합체의 물리화학적 특성 규명
 - 합성된 하이브리드 나노복합체의 방사성 핵종에 대한 기초 흡착성능 평가
 - 자성 하이브리드 나노복합체의 선택적 분리 흡착 메카니즘 규명
- 2차년도 : 자성 하이브리드 나노복합체를 이용한 방사성 액상 폐기물 처리 공정 설계
 - 배경물질의 유무와 종류에 따른 운전 성능 비교 평가
 - 흡착 운전 조건, 체류시간, 흡착제 투입량에 따른 운전 성능 비교 평가
 - 자성 하이브리드 나노복합체의 흡착 거동, 경쟁 흡착, 선택성 평가
 - 기초 운전조건 확립 및 반응기 설계
- 3차년도 : 자성 하이브리드 나노복합체를 이용한 방사성 액체 폐기물처리 최적 공정 시스템 개발
 - 실공정 적용을 위한 현장 공정 조건에서의 나노복합체 적용 기술의 성능 평가
 - 나노복합체 적용 기술의 안정성 평가
 - 현장 공정 적용을 위한 최적 운전 시스템 확립
 - 장기 연속운전 시 영향성 및 경제성 평가

■ 기타 연수 관련 정보 및 유의사항 : 해당사항 없음

■ 첨부자료 목록(필요시 별도파일로 제출) : 해당사항 없음