

Division of Material Chemistry	Research field	Analytical Chemistry	Lab. ID
			MC06
Laboratory web site	http://chem.s.kanazawa-u.ac.jp/anal/top.html		
Research subjects			
<p>The study covers (a, c) separation analysis of trace elements in waters by solvent extraction and chromatography, speciation analysis of heavy metals, (b) spectroelectrochemical study of charge transfer mechanism at liquid liquid interfaces, analytical application of functional nanomaterials, and development of chiroptical analysis with surface plasmon.</p> <p>(a) To develop selective separation and concentration methods of metal ions and metal complexes, a multi-component approach that integrates the use of sterically and hydrophobically designed extractants, ionic liquid chelate extraction and surfactant-assisted liquid-liquid extraction is conducted.</p> <p>(b) Charge transfer and adsorption behavior of various ionic species at polarized liquid liquid interfaces are studied by spectroelectrochemical techniques, e.g., electrochemical control of liquid liquid distribution of ionic species through specific interaction with dendritic polymers for a functional separation system, photochemical study of metal nanoparticles and luminescent carbon nanodots to develop high efficient photocurrent generation and spectrophotometric detection systems, etc. We are also developing novel chiroptical measurements with surface plasmon to analyze a small amount of chiral molecules.</p> <p>(c) Absolute determination method is an accurate, precise, and quantification method without calibration curves nor comparison standards. We developed a novel absolute determination method using substoichiometric isotope dilution for selective extraction of boric acid. Capillary zone electrophoresis with cyclodextrins as a chiral selector is also employed for the chiral separation of amino acids.</p>			
Master/Doctor course: Education policy, curriculum, typical activity in the laboratory			
<p>The course of Material Analysis Chemistry II for physical analytical chemistry deals with solution chemistry of metal ions and complexes as well as thermodynamics of liquid-liquid distribution of metal complexes. The material analysis seminar for the purpose of the commentary of a recent article in English and the thorough discussion is performed a week. Each student makes the study program for the year to get the deep understanding of his/her research theme. A lab-meeting for the discussion of the progressive report of his/her research works is carried out every week or two. Furthermore, the lab-meeting for presenting his/her research papers is held in July and December.</p>			
Daily life in the laboratory, etc.			
<p>We have several lab-events in the year; for example, a welcoming party of new members and undergraduate students, cherry-blossom viewing (Hanami), inter-lab meetings with other universities, and laboratory parties in the middle and the end of the year. Each student is assigned a personal desk and experimental space.</p>			
Message or comments by the laboratory faculty staffs			
<p>In our research area, careful planning and arrangement for experiments are essential to obtain fruitful results. The research experience in our group will foster your ability to scientific thinking and practical skill required for professional analytical chemists. We highly encourage students to participate in academic conference for research presentation.</p>			
Recent Master theses in these 3 years (+ more if appropriate)			
year.month	Thesis title (including English translation of Japanese thesis title)		
2017.3	Size-Dependent Photocurrent Enhancements of Gold Nanoparticles at Liquid Liquid Interfaces		
2017.3	Reaction Mechanism of Fluorescent Organic Molecules Affected by Dendritic Polymers at Liquid Liquid Interfaces		
2016.3	Spectroscopic study of Facilitated Proton Transfer by Hydrophobic Porphyrin Compounds at the Polarized Liquid Liquid Interface		
2016.3	Transport of lanthanoid(III) ions through supported liquid membranes based on tropolone-bidentate amine extraction system		
2016.3	Extraction equilibrium of lanthanoid(III) ions in ionic liquid synergistic extraction systems		
2015.3	Chiral separation and determination methods for an oxidized degradation product of microcystin by capillary electrophoresis		
2015.3	Spectroelectrochemical study of adsorption mechanism of luminescent organic nanoparticles at a polarized liquid liquid interface		
2015.3	Sensitive analysis of potential-dependent adsorption and orientation of water-soluble porphyrins at liquid liquid interfaces as studied by polarization-modulation total internal reflection fluorescence spectroscopy		
2014.3	Kinetic study of the extraction mechanism of copper (II) dialkyldithiocarbamates with various alkyl chonis in a liquid-liquid system		
2014.3	Heterogeneous photoinduced electron transfer at polarized liquid liquid interfaces in the presence of metal nano particles		

2013.3	Solvent extraction and ESI-mass spectrometry of nitrosyl ruthenium(III) complexes with various thiourea derivatives
2013.3	Copper (II) ion-selective carbon paste electrode based on the chelating ligand-containing ionic liquid
2013.3	Spectroelectrochemical analysis of encapsulation behavior of anionic species in PAMAM dendrimers at the polarized liquid liquid interface
Recent Doctoral theses in these 3 years (+ more if appropriate)	
year.month	Thesis title (including English translation of Japanese thesis title)
2016.3	Spectroelectrochemical Studies of Molecular Association with Polyamidoamine Dendrimers at Liquid Liquid Interfaces
2013.3	Ionic liquid extraction of metal(II, III) complexes with macrocyclic and chelating ligands
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