

ISEC2017

The 21st International Solvent Extraction Conference

November 5 - November 9, 2017
Seagaia Convention Center, Miyazaki, Japan

Более 350 участников

29 стран в т.ч. Чили, ЮАР, Иран, Канада, страны
ЕЭС, Россия, Индия, Китай, Корея, Япония

4 параллельно работающие секции

Более 100 докладов в области экстракции РЗЭ,
переработки ОЯТ, извлечения ДМ,
гидрометаллургии, аналитики, новых
экстрагентов и растворителей,
сверхкритической экстракции и др.



Компании участники конференции



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CEM EDGE



Группа компаний



is the world's largest primary producer of platinum, accounting for about 38% of the world's annual supply.

Экстракционные технологии аффинажа МПГ

Разработка химико-технологических процессов в области переработки различных видов сырья; изготовление оборудования (экстракционного, сорбционного, емкостного, фильтровального, вентиляционного, лабораторного, гальванического, оборудования по газоочистке и др.)

ТриАрк Майнинг – СП ICT Group и компании «РТ-Глобальные ресурсы» Госкорпорации «Ростех», добыча и переработка РЗМ и ниобия, производство высокотехнологичных материалов на основе РЗМ.

Стендовые доклады

EFFECTIVE SEPARATION OF Pt(IV), Pd(II) AND Rh(III) IN ACIDIC SOLUTION BY USING PHOSPHONIUM IONIC LIQUID

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²Center for Future Chemistry, Kyushu University

Abstract

Introduction

Precious Group Metals

Application

- Fuel Cell
- Automobile catalyst
- Electronic device

PGMs Consumption

150 T/year

Automobile 40%

Jewelry 37%

Electronic 23%

PGMs production limitation

- Present in low quantity
- Difficult to collect
- Unstable supply
- Huge gap between supply and demand

Alternatives PGMs Source

Waste Recycling

Automobile waste 40%

Jewelry waste 19%

Electronic waste 24%

Continuous increase over the next several years

These wastes are useful secondary resource for PGMs

Metal Groups (PGMs) Advantages

- Heat Resistance
- Heat Tolerance
- Good electrical conductor
- Facile Process

Development of effective extraction systems for PGMs using phosphonium ionic liquid

Using novel phosphonium ionic liquid, tricothyldecyl phosphonium chloride for PGMs extraction

EXPERIMENTAL

Development of effective extraction systems for PGMs using phosphonium ionic liquid

Using novel phosphonium ionic liquid, tricothyldecyl phosphonium chloride for PGMs extraction

IONIC LIQUID

- Negligible vapor pressure
- Non-flammable
- Tunable properties
- Structure design
- Action cation pairing

Hydrophobic ionic liquid

Water

Novel liquid in this study

Newly Designed and Synthesized

Commercially Available

Tricothyldecylphosphonium chloride

Trisilyldecylphosphonium chloride

Equation (1)

$$E\% = \frac{C_{org} - C_{aq}}{C_{org} + C_{aq}} \times 100$$

Equation (2)

$$D = \frac{C_{org}}{C_{aq}}$$

Legend:

- C: Metal Concentration
- V: Volume phase
- Org: Organic phase
- Aq: Aqueous phase
- St: Stripping phase

Synthesis of methacrylate-Styrene Copolymer Containing a Sulfur Atom and Extraction Equilibrium of Gold(III) from Hydrochloric Acid

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²Department of Applied Chemistry, University of Miyazaki, Japan

Introduction

Consumption of Rare metals in Japan

70% OF THE WORLD!

Wastes of Au 150t/yr

Urban mine (containing rare metals)

Potential resources

Recovery

method

selective recovery

large extraction capacity

easy back-extraction

organic phase

aqueous phase

selective recovery!

Physical properties

Molecular weight: 5.4 × 10⁴ [g/mol]

Interfacial tension: 16.1 [mN/m]

Quantitative of Nitrogen atom

Adsorption amount of N

0.25wt%-ATPS (chloroform)

0.25wt%-ATPS (chloroform)

0.1mM Metal

Synthesis

Functional group (S and N atoms)

DMF, K₂CO₃

135°C

3-hydroxybutyl-2-methylpropylsulfonium copolymer (ACM-CMSE)

2-methoxyethyl-2-(2-methylpropylsulfonium) copolymer (ATPS)

Reactor and synthesis step

Reflux

120rpm

MP: 4g / DMF

ACM-CMSE: 5g

K₂CO₃: 12g

DMF: 200ml

DW, Chloroform

Separation

0.1M-HCl

0.1M-NaOH

Evaporation

polymer gel

Yield: 66%

Extraction selectivity in HCl solution

Extraction from mixed solution

Cu: 0.1 → 250mM, 1.5M HCl

Changes in extraction ratio with time

Loading test of Pd(II)

0.2 → 1.5mM / 20mM

Selective extraction of antimony and arsenic with alkylated piperazine

(Miyazaki University) Shintaro Kanemaru¹, Rieko Miura, Tatsuya Oshima, Yoshinari Baba

1. Introduction

antimony

Antimony is superior in incombustibility and wear resistance.

- Flame retardant auxiliary
- Lead battery

arsenic

As for arsenic, a compound with gallium is superior in semiconductor properties.

- Solar light panel
- Light emitting diode

Resources are maldistributed in the specific countries, and Japan depends on the import

e-waste recycling rate is almost 0%

environmental pollution problems

Development of the selective extractant is important.

What is a solvent extraction?

Solvent extraction is a selective separation method for isolating and concentrating an objective material from aqueous solutions with an organic solution containing extractant.

3. Results and discussion

Metal extraction selectivity

TEHA

Extraction percentage (%)

log[HCl]_{aq}

● Sb(III)

○ Sr(IV)

▲ As(III)

▲ As(V)

DDCMP

Extraction percentage (%)

log[HCl]_{aq}

● Sb(III)

○ Sr(IV)

▲ As(III)

▲ As(V)

Fig. 1 Effect of concentration of hydrochloric acid on the extraction percentage of metal ions with TEHA and DDCMP.

Stripping of metals extracted

PGM Extraction Properties of Calix[4]arene-Based n-Dialkylamino Extractants from Leach Liquors of Automotive Catalysts

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²Department of Life Science, Graduate School of Engineering Science, Akita University

Introduction

Solvent Extraction

Extraction

Stripping

Developed Calixarene Extractants

This time Developed Extractants

Advantages of Solvent Extraction

- By selecting an extractant, separation of specific metals is possible.
- Purification and recovery of metals are possible at low cost.

These calixarene-based extractants have poor solubility in organic solvents.

Generally, solvent extraction by calixarene-based extractants is carried out using chloroform as a diluent, which is harmful to the human and the environment.

Developing a calixarene-based extractant which shows good solubility.

Experimental

Synthesis of Calixarene-based Extractants

Scheme 1 Synthesis of p-dialkylaminomethylcalix[4]arenes

Ref. M. Yamada et al. ChemistrySelect 2017, 2, 1052-1057

Extraction Procedure

Shaking 300 rpm

Centrifugation 3500 rpm

The aqueous phase were measured by ICP-AES

Extraction percentage (E%) were calculated by using equations (1) and (2).

Equation (1)

$$E\% = \frac{[M]_{org}}{[M]_{org} + [M]_{aq}} \times 100$$

Equation (2)

$$D = \frac{[M]_{org}}{[M]_{aq}}$$

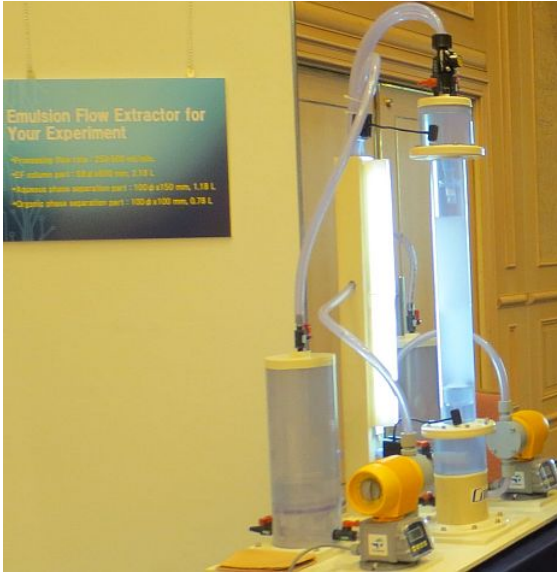
Result

Solubility of extractants for diluents

Table 1 Investigation of solubility of 1 - 8 in diluents

Diluents	Boiling point (°C)	Dielectric constant	Solubility in diluents							
			1	2	3	4	5	6	7	8
CHCl ₃	61.0	4.81	N.S.	G.S.	G.S.	G.S.	G.S.	G.S.	G.S.	G.S.
1,2-Dichloroethane	83.5	10.38	—	G.S.	G.S.	G.S.	G.S.	G.S.	G.S.	G.S.
o-Dichlorobenzene	180.3	9.93	—	G.S.	G.S.	G.S.	G.S.	G.S.	G.S.	G.S.
Chlorobenzene	131.0	9.62	—	N.S.	G.S.	G.S.	G.S.	G.S.	G.S.	G.S.
Toluene	110.0	2.38	—	N.S.	N.S.	G.S.	G.S.	G.S.	G.S.	G.S.
Xylene	138.4	2.20	—	N.S.	N.S.	N.S.	N.S.	G.S.	G.S.	G.S.
Kerosene	150-300	1.80	—	N.S.	N.S.	N.S.	N.S.	G.S.	G.S.	G.S.
Shellcil D70 [®]	193-245	2.10	—	N.S.	N.S.	N.S.	N.S.	G.S.	G.S.	G.S.

Выставка оборудования

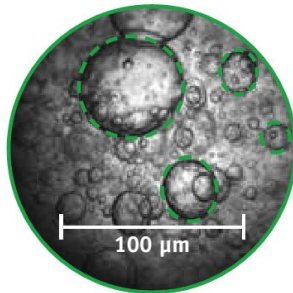


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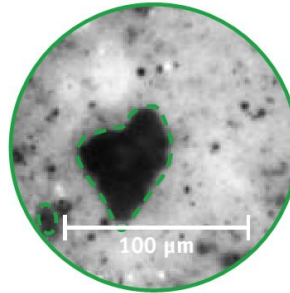
Прибор для наблюдения за технологическими процессами в реакторе



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Приглашение на конференцию ISEC-2020

ISEC 2020 in Sweden





GOTHENBURG

Sweden



BETWEEN MEETINGS

Gastronomic brilliance
This gourmet's dream offer innovative cuisine using local produce. Specialty fish and shellfish is our claim to fame. Cuisine from all over the world is offered at reasonable prices at first-class, gourmet, trendy or traditional restaurants. Sjörenskaagiet are awarded with a Guide Michelin star.

Attractions
Gothenburg and West Sweden offers an exceptional combination of city life, culture and nature. Historical and contemporary attractions and activities are miles with a wide repertoire of entertaining shows, sports, cultural events, shopping, fairs and exhibitions.

A number of prominent cultural institutions are found in five minutes walking distance. View the unique collection of Nordic art at the Museum of Art or enjoy Gothenburg Symphony Orchestra at the Concert Hall.

Relax
In less than half an hour you'll be on a boat taking you to the picturesque islands of the archipelago. The many islands stretch along the coast like a string of pearls. The many tree-covered parks, as well as forests and lakes are only a stone's throw away.

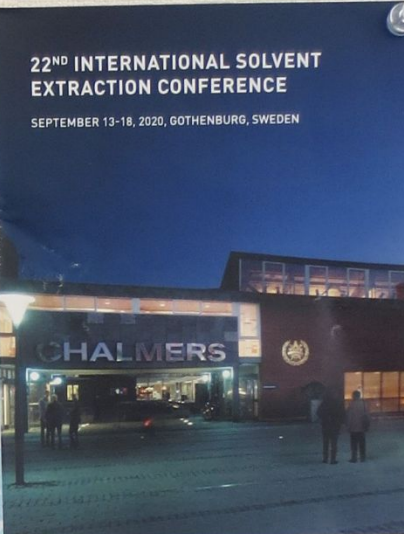
GETTING HERE IS EASY

- International airport less than 20 minutes from the city centre.
- 80 direct flights from more than 60 destinations.
- Ferry from Kiel and Friedrichshafen.



22ND INTERNATIONAL SOLVENT EXTRACTION CONFERENCE

SEPTEMBER 13-18, 2020, GOTHENBURG, SWEDEN



CHALMERS

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COPPER INTERNATIONAL CONFERENCE
AUGUST 18-21, 2019 | VANCOUVER, BC, CANADA

SAVE THE DATE

Metsoc, the 58th annual Conference of Metallurgists (COM 2019) and CIM are honoured to host Copper 2019, marking a milestone in the International Copper Conference Series with the 10th Edition.

Featuring:

- Mining & Geology
- Mineral Processing
- Electrowinning & Electrorefining
- Pyrometallurgy
- Hydrometallurgy
- Process Control
- Sustainable Development, Health & Safety, and Environment
- And more!

Conference Chair: COM 2019 Chair: Dr. Edward Asselin, University of British Columbia
Copper Chair: Dr. Jari Kapusta, SBA Inc.

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Organized by: **metsoc.org**

Cu IN VANCOUVER IN 2019

August 18-21, 2019
Vancouver, BC, Canada

COPPER 2019 COPPER INTERNATIONAL CONFERENCE | 10th Edition

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