



사단법인
한국에너지학회
KOREAN ENERGY SOCIETY

www.koes.or.kr

2022년도 한국에너지학회 춘계학술발표회

2022년도 한국에너지학회 춘계학술발표회

일시. 2022년 4월 27일(수)~4월 29일(금)

장소. 제주 오리엔탈호텔

주최. 사단법인 한국에너지학회

후원.



DANSUK



한국아이티오 (주)



고려대학교
KOREA UNIVERSITY



CONSTRUCTION
ENGINEERING SERVICE



한국전력기술

사단법인

www.kose.or.kr

한국에너지학회

KOREAN ENERGY SOCIETY

특별세션 9

abstract p.64~p.73

- 일 시 : 2022년 4월 29일(금) 10:00~12:30
- 장 소 : F발표장 (B1층 몽블랑)
- 주 관 : 한국지질자원연구원
- 세션명 : 2050 탄소중립을 위한 탄소광물화 기술 산업화

• 좌 장 : 최준현(한국지질자원연구원)

순서	발표 제목	발표자	소속
1	Recovery of Nitrogen from Waste Diaper through Alkaline Stabilization: Optimization by response surface methodology	Lulit Habte	Korea Institute of Geoscience & Mineral Resources
2	Technological approach for utilization of fly ash and red mud as raw materials of CSA cement in Vietnam: Achieving Net-Zero carbon by 2050	Nguyen Van Duc	Korea Institute of Geoscience & Mineral Resources
3	A Case Study of Numerical Analysis to Select the Optimal Injection Locations for the Backfilling in Korean Limestone Mines	Youngmin Yoon	Seoul National University
4	An Empirical Study on CSA Cement and Backfill Material for Abandoned Mine Openings	Hyeon-woo Lee	Kangwon National University
5	Current status and prospect of domestic raw material supply and demand for commercialization of carbon mineralization technology	Eu-Dug Whang	Korea of Mining Industry Association
6	Immobilization of Chromium hexavalent oxyanions in wastewater and coal ash leachate by in situ carbon mineralization	Chaeyeon Lim	Korea Institute of Geoscience & Mineral Resources
7	Enrichment and Association of Rare Earth Elements with Unburnt Carbon Obtained from Coal Ash	Mohd Danish Khan	Korea Institute of Geoscience & Mineral Resources
8	Novel Alkali Activation Integrated Mineralization towards CO ₂ Sequestration and Rare Earths Enrichment from Fly Ash	Lai Quang Tuan	Korea Institute of Geoscience & Mineral Resources
9	A Study on K-ETS Offset project methodology development of carbon mineralization technology for rare earth element concentration	Eundon Jeon	Korea Research Institute on Climate Change
10	A Study on the Analysis of Emission Sources for Development of Greenhouse Gas Reduction Methodology of Rare Earth Extraction Technology Based on Carbon Mineralization	Wan Cheon	Korea Research Institute on Climate Change

[특별세션9. 2050 탄소중립을 위한 탄소광물화 기술 산업화]

Immobilization of Chromium hexavalent oxyanions in wastewater and coal ash leachate by *in situ* carbon mineralization

Chaeyeon Lim^{1,2} · Mohd Danish Khan² · Junhyun Choi² · Heeyoung Shin² · Hyunjung Kim^{1*} · Ji Whan Ahn^{2*}

¹Department of Earth Resources Environment Engineering, Hanyang University, ²Center for Mineral Processing & Metallurgy Research, Korea Institute of Geosciences and Mineral Resources

The IPCC has envisioned a target of sequestering ~32 Gt of atmospheric carbon dioxide (CO₂) by 2020–2030 to achieve the climate goals (limit warning 1.5 °C). Carbon mineralization is a technology used to sequester atmospheric CO₂ by reacting with alkaline waste to form mineral carbonates and holds immense potential in reducing global warming. However, the alkaline wastes such as coal ash, bauxite residue, and steel slag contain heavy metals that can be hazardous to the environment when leached out. According to the EPA, chromium(VI) oxyanions leaching from coal ash is a serious issue due to its toxicity. Cr(VI) concentration in coal ash leachate can reach 5,000 ppb, much higher than the threshold standard of 100 ppb for surface/ground water. In this study, *in situ* carbonation experiments were conducted for the immobilization of Cr(VI) oxyanions in wastewater and coal ash leachate. Thermodynamic simulations were carried out to identify the reaction possibilities and formation of any Ca–Cr related products. To obtain maximum immobilization efficiency, experimental parameters such as the CaO dosage, solution pH, temperature, and CO₂ flowrate were investigated. Results revealed that the solution pH and CO₂ flowrate affected Cr(VI) immobilization to a greater extent than the other studied parameters. We hypothesized that Cr(VI) immobilization occurs by surface adsorption and incorporation of Cr(VI) within calcium carbonate crystals.

Acknowledgement

This research was also supported by the National Strategic Project–Carbon Mineralization Flagship Center of the National Research Foundation of Korea (NRF) funded by the Ministry of Science and ICT (MSIT), the Ministry of Environment (ME) and the Ministry of Trade, Industry and Energy (MOTIE) (2017M3D8A2084752).

This research was financially supported by the Ministry of Trade, Industry, and Energy (MOTIE), Korea, under the “Infrastructure program for industrial innovation” supervised by the Korea Institute for Advancement of Technology (KIAT)(P0018011).



학회소개

학술대회/행사

학술지

커뮤니티

회원서비스

2023 한국에너지학회 춘계학술발표회

2023 Korean Energy Society Spring Conference

2023. 4. 26.(Wed) ~ 4.28.(Fri)
라마다프라자제주호텔

○ ● ||

공지사항

한국에너지학회 제27대 이관영 회장 취임

2023.01.02

공지사항

+

[한국공학한림원]제2회 ... 2023.02.02

한국에너지학회 제27대 ... 2023.01.02

한양에너지환경연구원 ... 2022.12.05

[채용] 서울과학기술대학... 2022.11.23

<단석학술상>, <학술연... 2022.11.04

「신진 연구자상」, 「... 2022.11.02

[한전 경영연구원] 경영... 2022.11.02

2022 그린 에너지 & ... 2022.10.28

학술대회 공지

+

[춘계] 숙박예약안내 2023.02.06

[2023 춘계] 한국에너지... 2023.02.06

2023년도 학술대회 일정 2022.11.10

학술대회 증명서 발급 안내 2022.10.24

[추계] 2022 추계학술대... 2022.10.19

[추계] 2022 추계학술발... 2022.10.10

[추계] 접수마감 연장 공지 2022.09.16

[추계] 숙박예약안내 (쑈... 2022.09.02

2023년도 한국에너지학회 춘계 학술대회

◇ 날짜 : 4.26(수) ~ 4.28(금)
◇ 장소 : 라마다프라자제주호텔

갤러리

+



논문검색



논문투고



학회소식



회원가입안내

