

Topical Conference: Critical Minerals for the Clean Energy Transition

Held at the 2024 AIChE Annual Meeting

San Diego, California, USA
27-31 October 2024

ISBN: 979-8-3313-1670-9

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2024) by AIChE
All rights reserved.

Printed with permission by Curran Associates, Inc. (2025)

For permission requests, please contact AIChE
at the address below.

AIChE
120 Wall Street, FL 23
New York, NY 10005-4020

Phone: (800) 242-4363
Fax: (203) 775-5177

www.aiche.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

CRITICAL MINERALS FOR THE CET: MAGNET RECYCLING (INVITED TALKS)

292d Materials Recycling for Transportation Electrification	1
<i>Ikenna Nlebedim, Denis Prodius, Anirudha Karati, Sourav Das, Sabyasachi Paul, Pranav Shrotriya</i>	
292e Techno-Economic Analysis of Critical Materials Recycling from Computer Hard Drives	2
<i>Maoqi Feng</i>	
292b Protein Ligands for Separation of Rare Earth Elements	3
<i>Joseph Cotruvo, Jr.</i>	

CRITICAL MINERALS FOR CET: RARE EARTH ELEMENTS (INVITED TALKS)

437c A Comprehensive Modeling Framework for Critical Materials Processing	4
<i>David Miller, Andrzej Anderko</i>	
356d Opportunities for Membrane Materials and Processes to Advance Sustainable Critical Mineral Separations	5
<i>Jonathan Ouimet, Laurianne Lair, Xinhong Liu, Merlin Bruening, Alexander Dowling, William Phillip</i>	
356e Engineered Peptides for Rare Earth Element Recovery	6
<i>Julie Renner, Geeta Verma, Jacob Hostert, Alex A Summerville, Bernadette Schneider, Lianna Johnson, Alicia Robang, Alicia Robang, Ricardo Garcia Carcamo, Anant Paravastu, Rachel Getman, Christine Duval</i>	
356c A Computational Framework for Optimizing and Evaluating Critical Mineral Opportunities in Produced Water Networks	7
<i>Arsh Bhatia, Georgia Stinchfield, Daniel Ovalle, Miguel A. Zamarripa, Markus G. Drouven, Ignacio Grossmann, Carl Laird</i>	

CRITICAL MINERALS FOR THE CLEAN ENERGY TRANSITION (INVITED TALKS)

437b The Role of Life Cycle Assessment in Guiding Minerals Extraction and Recycling for the Clean Energy Transition	9
<i>Jennifer Dunn</i>	
437d Turning Wastewater to Value-Added Products: Mining Critical Elements from Hypersaline Brines and Reducing Materials Usage.....	10
<i>Zhenxing Feng</i>	
437a Molecular Design of Redox-Mediated Electrochemical Separations for Critical Element Recovery.....	11
<i>Xiao Su</i>	
437e Pilot-Scale Testing and Trends of Extraction of Rare Earth Elements and Critical Minerals from North Dakota Lignite	12
<i>Ahmed Essam, Nolan Theaker, Abdelmalek Bellal, Nicholas Dyrstad-Cincotta</i>	

Author Index