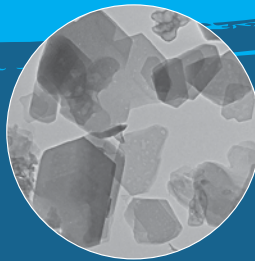




**XVII ICC**  
ISTANBUL 2022  
25 -29 JULY

*New Interfaces Bridging  
Continents and Cultures  
with Clays*



**SCIENTIFIC RESEARCH  
ABSTRACTS**



# KARBEN

BENTONITE

33<sup>rd</sup>  
year



MORE THAN  
**300,000,000 TONS**  
NON-TREATED BENTONITE RESERVES  
IN TOTAL MINING CONCESSION  
AREA OF  
**48,784,200 m<sup>2</sup>**

T: +90 (312) 287 1714 (Pbx) e-mail: [info@karben.com.tr](mailto:info@karben.com.tr)

[www.karben.com.tr](http://www.karben.com.tr)

**AIPEA – XVII INTERNATIONAL CLAY CONFERENCE  
ICC 2022**

**25–29 JULY 2022  
HILTON MASLAK ISTANBUL, TURKEY**

**SCIENTIFIC RESEARCH  
ABSTRACTS**



**XVII ICC**  
ISTANBUL 2022  
25 -29 JULY



Copyright © 2022 by the Authors

Selection by the Scientific Committee of ICC 2022.

The policy of Scientific Research Abstracts is to provide full access to the bibliographic contents if a correct citation to the original publication is given (rules as in CC 3.0). Therefore, the authors authorize to i) print the abstracts; ii) redistribute or republish (e.g., display in repositories, web platforms, etc.) the abstracts; iii) translate the abstracts; iv) reuse portions of the abstracts (text, data, tables, figures) in other publications (articles, book, etc.).

AIPEA – XVII INTERNATIONAL CLAY CONFERENCE

ICC 2022

25–29 JULY 2022

HILTON MASLAK ISTANBUL, TURKEY

Organized by

THE CLAY SCIENCE SOCIETY (TURKEY)

THE CLAY MINERAL SOCIETY (USA)

AIPEA

Scientific Research Abstracts

Editors: Selahattin Kadir, Paul A.Schroeder, Asuman Türkmenoğlu, Fahri Esenli, and Emin Çiftçi



XVII ICC  
ISTANBUL 2022  
25 -29 JULY



## The characteristics of V(V) and P(V) adsorption by LDH derived from magnesite: kinetics, pH influence and competition with common anions

**Karolina Rybka<sup>1\*</sup>, Jakub Matusik<sup>1</sup>, Klaudia Dziewiątka<sup>1</sup>, Agnieszka Giera<sup>1</sup>, Mateusz Marzec<sup>2</sup>**

<sup>1</sup>AGH University of Science and Technology, Faculty of Geology, Geophysics and Environmental Protection, al. Mickiewicza 30, 30-059 Krakow, Poland

<sup>2</sup>AGH University of Science and Technology, Academic Centre for Materials and Nanotechnology, al. Mickiewicza 30, 30-059 Krakow, Poland

\*krybka@agh.edu.pl

With a vast amount of research devoted to new adsorbents for wastewater treatment, special attention is given to the development of simple low-cost materials. This study described the adsorption properties of Mg/Al and Mg/Fe LDH derived from magnesite (M) (Rybka et al., 2022). The affinity towards V(V) and P(V) of the studied materials was compared with that of LDH conventionally obtained from chemical reagents.

The structure of LDH is built of brucite-like layers build from divalent ( $M^{II}$ ) and trivalent ( $M^{III}$ ) metal octahedra. The positive charge of the layers is balanced by easily exchangeable hydrated anions. This makes LDH a promising material for the removal of anionic pollutants. In this work, the M was used as a  $M^{II}$  source substituting the conventionally used chemical reagents. It was dissolved in  $AlCl_3$  or HCl to release Mg(II) for the synthesis of Mg/Al and Mg/Fe LDH, respectively. The LDH materials were obtained with a co-precipitation method.

The studied materials were compared to the reference LDH samples obtained exclusively from the chemical reagents. The maximum capacity of the materials was tested in the removal reactions of V(V) and P(V) chosen as toxic and eutrophogenic elements, respectively. The minimal doses of the adsorbents were determined for the effective removal of low initial concentrations ( $C_{in} = 0.05$  mmol/L) of the anions. The kinetics, pH effect (pH = 3 and 5) and co-existing anions ( $SO_4^{2-}$ ,  $NO_3^-$ ) influence on adsorption efficiency were described.

The materials showed a high affinity for V(V) and P(V). The Fe-bearing materials were more efficient than their Al-containing analogues. The removal rate of P(V) was lower than that of V(V). The  $SO_4^{2-}$  influenced the removal rate of V(V) by Al-bearing LDH. The lower pH increased the removal of P(V) by Fe-bearing materials. In the other cases, the adsorption efficiency of V(V) and P(V) did not decrease, which confirmed the high stability of the materials at pH = 3. In turn, the removal of competitive anions drastically decreased.

Rybka K., Matusik J., Marzec M. (2022) Mg/Al and Mg/Fe layered double hydroxides derived from magnesite and chemicals: The effect of adsorbent features and anions chemistry on their removal efficiency. *Journal of Cleaner Production*, 332, 130084  
This project was supported by the National Science Centre Poland, under a research project awarded by Decision No. 2017/27/B/ST10/00898.