Researchers propose new approach for harmless disposal of phosphogypsum

July 13 2023, by Li Yuan

At present, more than 6 billion tons of phosphogypsum (PG) accumulates worldwide, with an annual growth of ~280 million tons. More than 60% is stored in mountains. Phosphorus pollution from PG due to rainwater immersion has caused serious water environment and ecological problems. Efficient phosphate recovery and resource utilization techniques are crucial to solving this problem.

Recently, a research group led by Prof. Chen Jingan from the Institute of Geochemistry of the Chinese Academy of Sciences (IGCAS) has recovered phosphorus resources from PG efficiently by zirconium membrane-triggered adsorption and struvite crystallization, and clarified the detailed mechanisms of separation and purification of phosphate down to atomic scale. The work was published in Chemical Engineering Journal on June 29.

"Adsorption-complexation is the main purification mechanism of phosphate with the new zirconium membrane. These membrane materials can be recycled to effectively reduce process costs," said Prof. Chen.

The researchers found that more than 90% of the active phosphorus components in PG could be efficiently recovered through the adsorption process triggered by the new zirconium membrane, and simultaneously realize the harmlessness of PG. The desorbed and concentrated phosphate radicals are then prepared into high-value agricultural fertilizers.
The findings of this study not only demonstrate a novel approach to realize efficient resource utilization of PG, but also provide insights for pollution control and comprehensive utilization of PG in karst regions and even the world.


Provided by Chinese Academy of Sciences


This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.