

Chemical leaching of rare-earth elements from highly REY-rich mud with carbonated water

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During the research cruise KR13-02 of R/V Kairei, highly and extremely REY-rich mud (total REY concentration exceeds 3,000 ppm and 5,000 ppm, respectively) were collected within the Japanese exclusive economic zone surrounding Minamitorishima Island, northwestern Pacific Ocean. Due to its great economic value, the REY-rich mud has received attention as a newly promising resource for rare-earth elements.

Takaya et al. (2015) reported that the optimum conditions for chemical leaching of rare-earth elements from highly REY-rich mud with strong acid (HCl and H₂SO₄). The study shows that the apatite grains, the main host mineral of REY, dissolve easily in the diluted acid solution under room temperature. We have conducted the chemical leaching experiments with carbonated water which may enable to integrate the leaching and recovery processes (the recovery of rare-earth elements from the leaching solution as a carbonate minerals). Here, we explain the concept of this hydrometallurgical processes and report the preliminary results of our experiments.

Keywords: REY-rich mud, Chemical leaching, Deep-sea mineral resources