Chemical leaching experiments on the highly REY-rich mud collected near the Minamitorishima Island.

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Since the discovery of rare earths and yttrium (REY)-rich mud distributed widely on a deep seafloor in the Pacific Ocean (Kato et al., 2011), it has received broad attention as a new resource for REY. More recently, during research cruise KR13-02 of R/V Kairei, extremely REY-enriched deep-sea mud containing more than 6,000 ppm total REY (\(\sum\)REY) was collected near Minamitorishima Island, northwestern Pacific Ocean. One of the key issues on the future development and utilization of the new deep-sea mineral resources (REY-rich mud) is to establish a procedure to extract REY from the mud. Kato et al. (2011) showed that chemical leaching is an effective means to extract REY from REY-rich mud. In this study, therefore, we conducted series of leaching experiments on highly REY-rich mud (\(\sum\)REY \(\approx\) 3,500 ppm) collected near Minamitorishima Island to determine the optimum conditions of REY leaching. Our results showed that more than 95% and 80% of \(\sum\)REY can be recovered by hydrochloric acid and sulfuric acid, respectively. REY recovery was at the highest under the conditions of the lower acid concentration (0.25-0.5 mol/L), shortest leaching time (~5min), and room temperature (25 \(^\circ\)C). These leaching conditions are strong advantages for the development of REY-rich mud.

Keywords: deep-sea mineral resources, REY-rich mud, chemical leaching