

## Determination of solubility products of rare earth carbonates in relevance to mechanism of rare earth element partitioning into calcium carbonate

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We determined solubility products of rare earth carbonates, and examined partitioning mechanism of rare earth elements (REE) into calcium carbonate using these data.

The REE carbonates used were some purchased carbonates as well as the synthesized ones. Their chemical compositions, crystallinities, and crystal shapes were examined before use. These REE carbonates were placed in polyethylen bottles with H<sub>2</sub>O or NaCl solutions under room temperature, and the bottles were opened to atmosphere for about 6 months. The solubility products were calculated from the values of pH, alkalinity, and REE concentrations in the solutions.

The solubility products obtained using H<sub>2</sub>O for 6 month duration are plotted against atomic number in Fig. 1 together with those reported in the previous studies [1, 2]. These data show increasing tendency from Nd to heavy rare earth elements (HREE), and our values fall within a relatively narrow range despite the differences in the chemical compositions and crystal shapes.

These solubility products connected with the previously obtained partitioning coefficient [e.g., 3] were examined in the light of the partitioning mechanism.

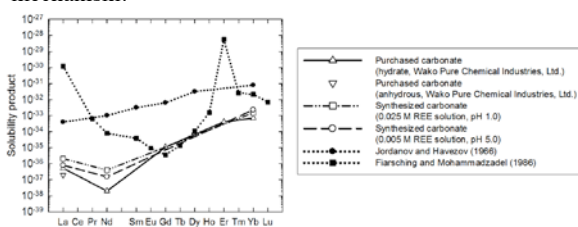


Fig. 1 The solubility products of REE carbonates in distilled water for six-month experiments.

### Reference:

- [1] Jordanov and Havezov (1966), *Z. Anorg. Allg. Chem.* 347, 101–106.
- [2] Firsching and Mohammadzadel (1986), *J. Chem. Eng. Data* 31, 40–42.
- [3] Toyama and Terakado (2014), *Geochem. J.* 48, 463–477.