Dolomitization of $CaCO_3$: an experimental study at 200 (or 130) °C

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Some limestones contain dolomite. As for the formation of dolomite, conversion of calcite into dolomite has been considered [1]. In order to understand the genesis of dolomite, the composition of dolomitization fluids is important. To calculate the concentrations of chemical elements in the fluids, the partition coefficients between dolomite and aqueous solution are necessary. We would like to report the experimental partition coefficients of some trace elements for dolomite.

In order to synthesize dolomite, $CaCO_3$ reagent (calcite) and 2M $MgCl_2$ + 0.5M NaCl solution together with some trace elements were sealed in a Carius tube. The Carius tubes were heated in an oven at 200 (or 130) °C for about 10 (or 30) days. Run products of solids and liquids in the tubes were separated by filtrations. The solids (dolomite) were dissolved in 0.5M hydrocloric acid (or 0.5M acetic acid) solutions. The chemical element concentrations in the dolomite and the liquid were measured.

The apparent partition coefficients were calculated by dividing the concentrations in the dolomites by those in the solutions, and are shown in Fig. 1. For divalent ions, the partition coefficients seem to decrease from Mn to Ba. This indicates that the partitioning between the dolomite and the solution is largely affected by the size of the cation site in the crystal structure and ionic radii of the substituting elements.

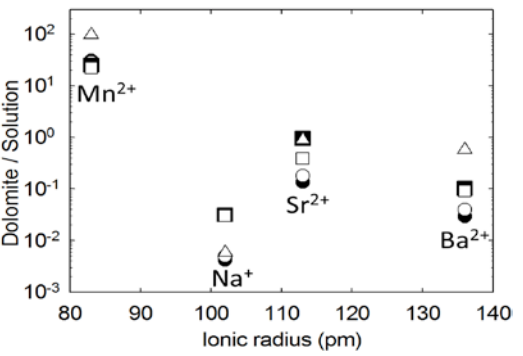

Fig. 1. The apparent partition coefficients for dolomite.

[1] Budd (1977) Earth science review 42, 1-47.