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2 **Supplement 1.** Typical powder X-ray diffraction patterns for the solid run products of

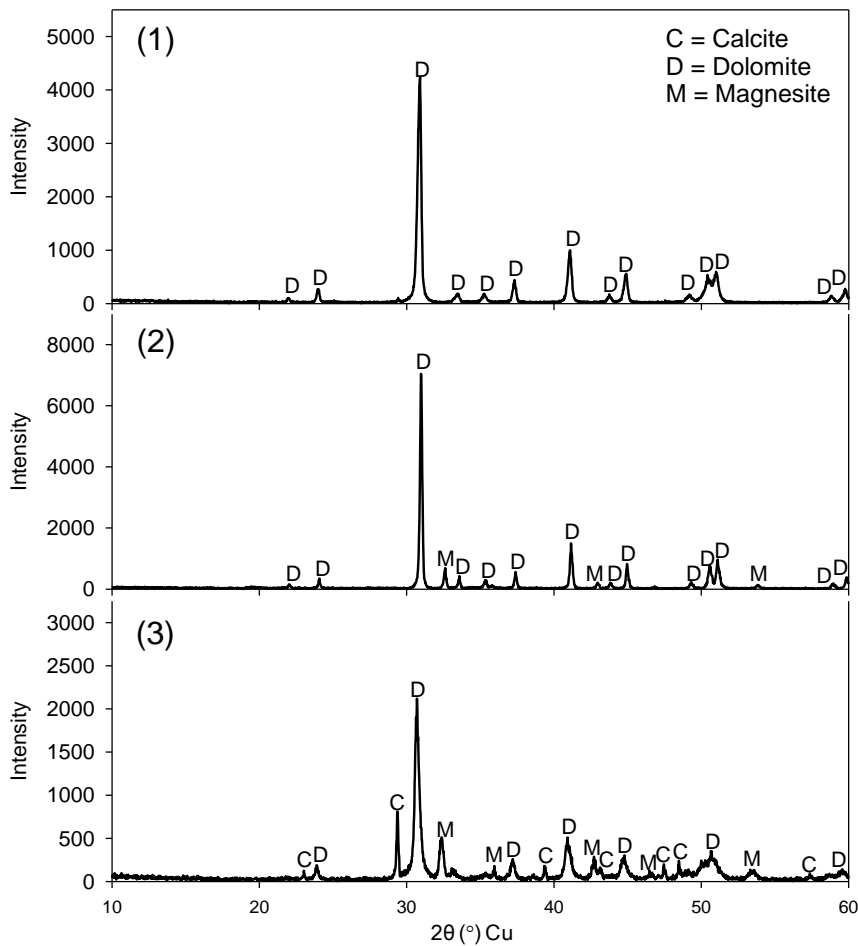
3 (1) Run 1, (2) Run 3 and (3) Run 5.

4 The solid run products were classified into three types. Runs 1 and 2 produced

5 dolomite, Runs 3 and 4 produced dolomite and magnesite and Run 5 produced a

6 mixture of calcite, dolomite and magnesite.

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13 **Supplement 2.** Dissolution rates of calcite, aragonite, dolomite and magnesite in 0.5
14 M acetic acid.

15 Pure calcite, aragonite, dolomite and magnesite were crushed by an agate mortar.

16 These particle-sized samples (10–20 μm) of these samples were sorted using nylon

17 mesh sieves. To determine the dissolution rates, these pure samples were treated with

18 40 mL of 0.5 M acetic acid at 25°C. After an appropriate reaction time, the remaining

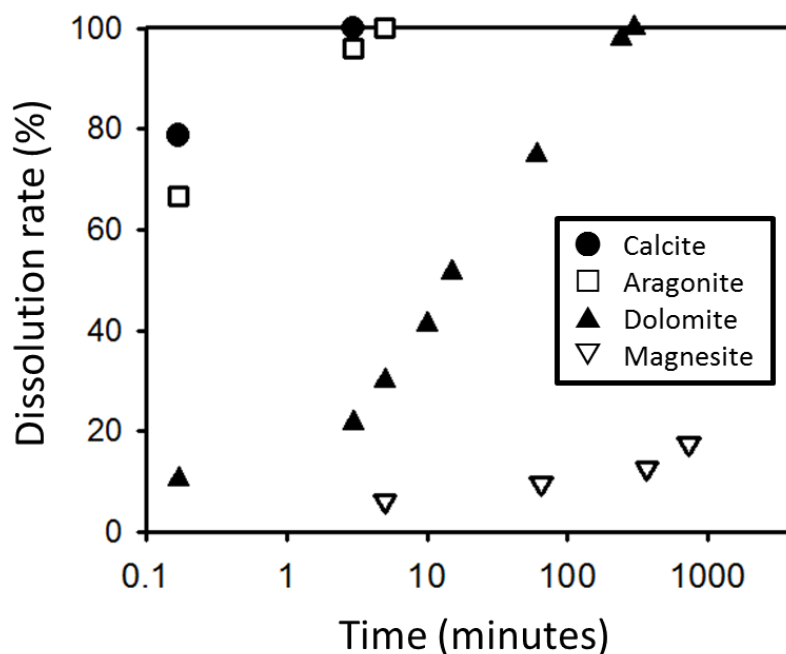
19 minerals were collected by centrifugation, dried, and weighed with an electric balance

20 in a dry box. The changes of the calcite, aragonite, and dolomite dissolution rates with

21 time were previously reported by Toyama and Terakado (2015). In the present study,

22 novel data for magnesite was added.

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