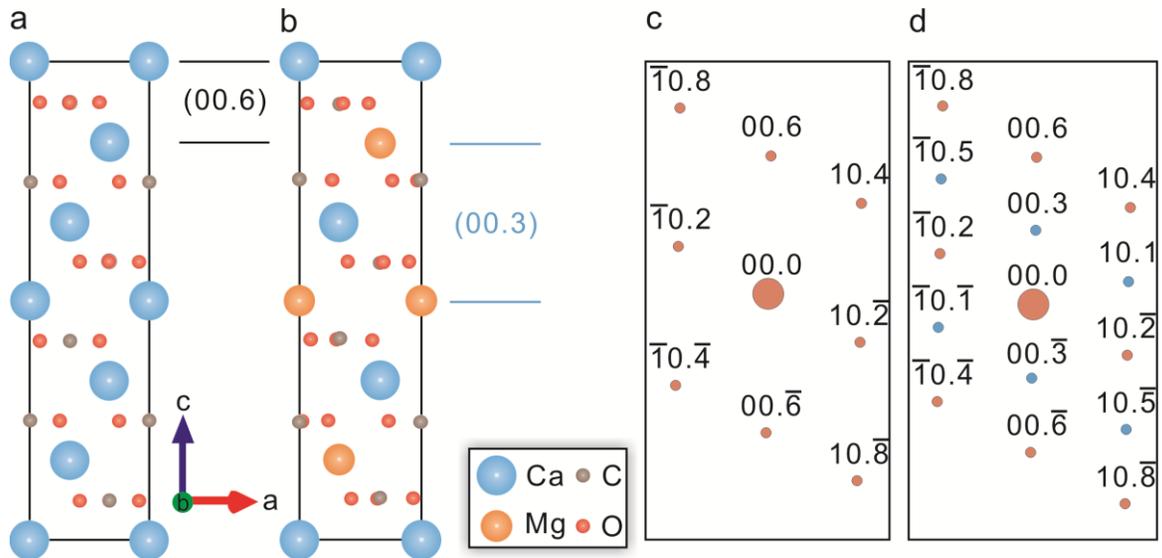
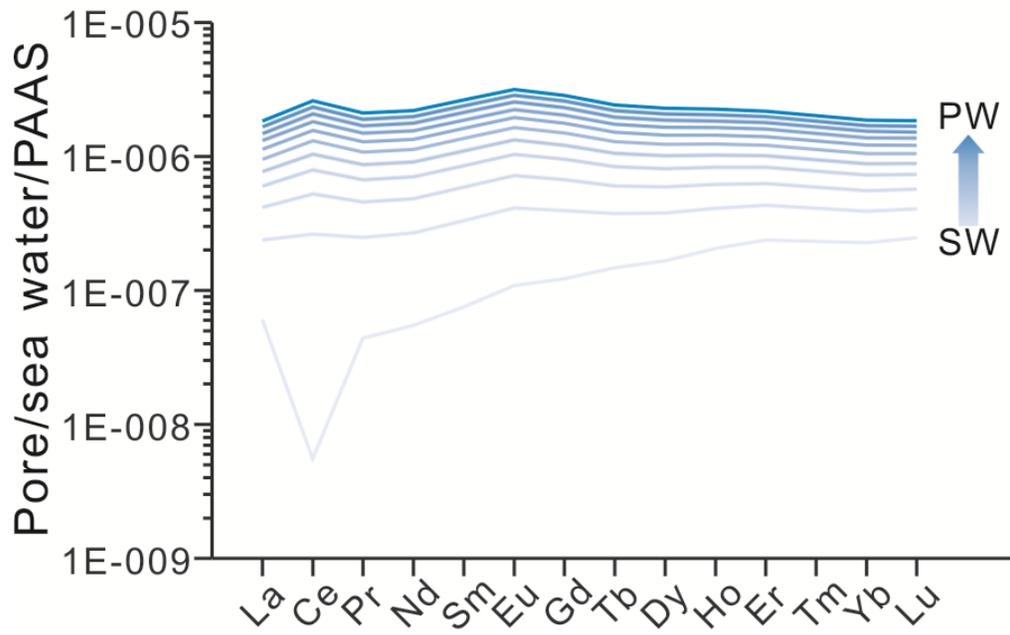


Figure A1



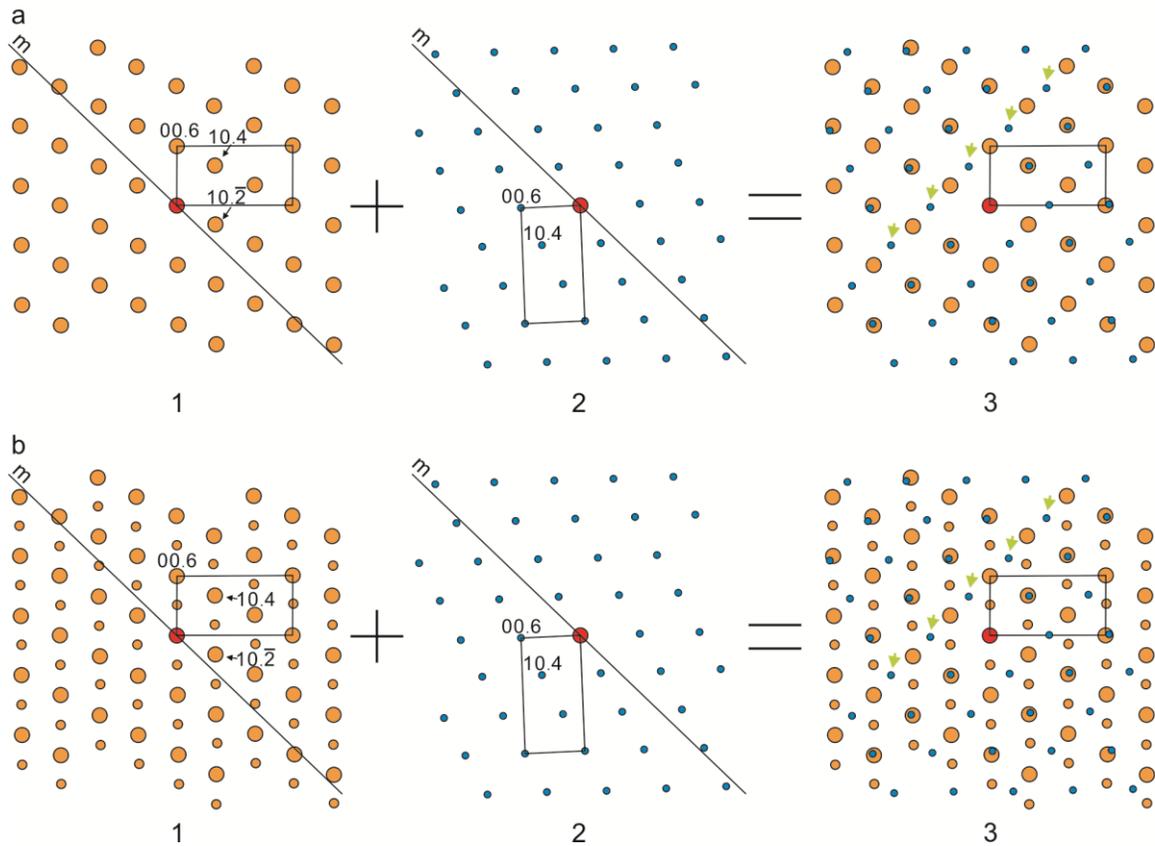
**Figure A1.** Sketch illustrating the structure and the [010]-zone axis diffraction patterns of Mg-free calcite (a and c) and ordered, stoichiometric dolomite (b and d). Compared with calcite, dolomite is constructed by alternating  $\text{Ca}^{2+}$  and  $\text{Mg}^{2+}$  layers along the c axis, which produces the superstructure reflections (blue dots in d), such as (00.3) and (10.1), in the diffraction patterns of dolomite at [010] zone axis. Such superstructure reflections in Ca-Mg carbonates indicate cation ordering and are the characteristics of dolomite structure. Modified after Lu et al. (2015).

## Figure A2



**Figure A2.** Shale-normalized rare earth element patterns of seawater (Alibo and Nozaki, 2000), pore water (Bayon et al., 2011), and the mix of them in which the portion of pore water is increased by 10% at each step.

Figure A3



**Figure A3.** Sketch illustrating the formation of *c* reflection by overlapping the [010]-zone axis diffraction patterns of calcite and calcite (a) and calcite and dolomite (b) that are related by (10.4) twins. After Larssone and Christy (2008) and Shen et al. (2013).