Table S1. Chromatography protocol for Mg purification (Wombacher *et al.*, 2009).

Step	Reagent	Volume	Eluted
Loading resin	AG 50W-X8 cation exchange resin	1 mL	
Resin cleaning	4 M HCl	30 mL	
Resin conditioning	0.4 M HCl	3 mL	
Sample loading	Sample solution (1µg Mg in 0.4 M HCl)	0.25 mL	
Matrix removal	0.4 M HCl	28 mL	
	0.15 M HF	6 mL	Be Al Ti
Rinsing	Milli-Q water	1 mL	
	95% acetone-0.5M HCl	6 mL	Fe Mn
Rinsing	Milli-Q water	2 mL	
	1 M HCl	12 mL	Collect Mg

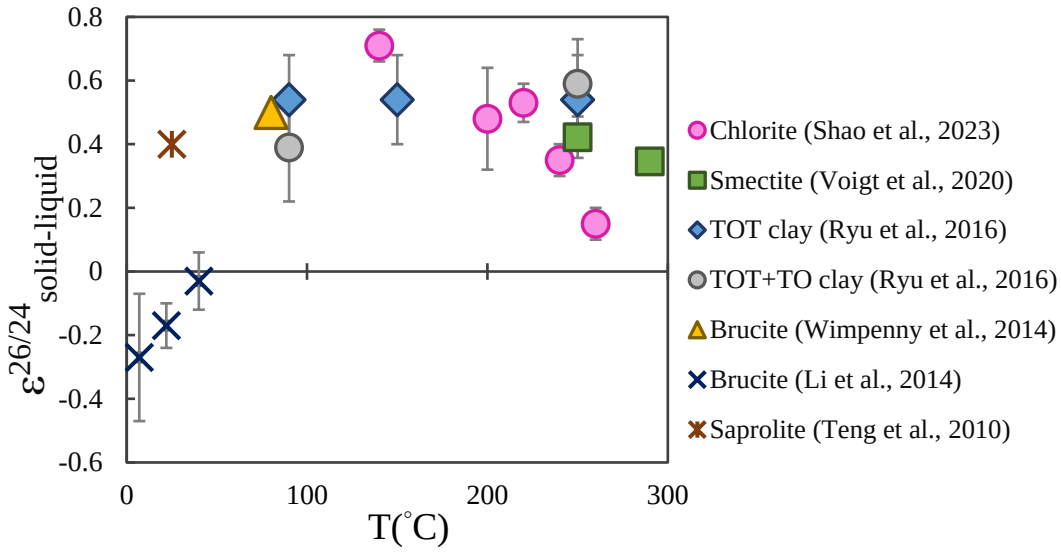

Fig. S1. Literature information on Mg isotope fractionation under various water-rock interaction in silicate/water systems.

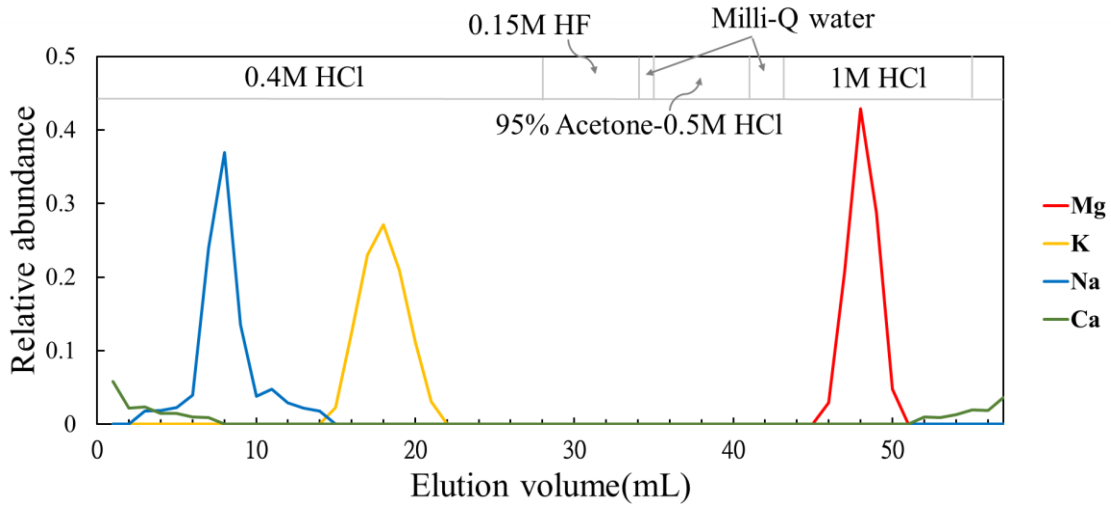

Fig. S2. The elution curve of a standard seawater specimens (IAPSO) using AG 50W-X8 cation exchange column. The blue color block range indicates where Mg was collected.