Table S1. REEs in different types of surface sediments in the CCZ (Huang et al., 2015) [30].

REE	Zeolite clay	Pelagic clay	Siliceous mud	Siliceous clay	Calcareous clay	Calcareous soft mud
Y	188.95	113.88	100.26	89.40	42.70	23.30
La	117.30	60.93	62.75	57.67	33.30	16.85
Ce	86.08	93.4	85.45	86.7	53.00	27.85
Pr	33.30	22.95	17.85	17.42	11.80	6.40
Nd	150.14	92.29	78.99	71.33	37.90	20.90
Sm	34.81	23.47	18.75	16.75	8.60	4.70
Eu	7.88	6.16	4.97	4.43	2.07	0.97
Gd	37.11	25.84	18.46	16.3	8.59	4.77
Tb	4.48	3.85	2.66	2.39	1.30	0.75
Dy	34.75	23.72	18.35	16.4	7.63	4.06
Ho	7.04	5.27	3.72	3.23	1.76	0.96
Er	19.45	13.65	10.04	8.94	4.93	3.57
Tm	4.17	2.15	1.86	1.62	0.63	0.37
Yb	17.10	12.59	9.32	8.21	3.96	2.21
Lu	2.62	3.12	1.47	1.30	0.58	0.34
∑REY	745.16	503.28	434.89	402.08	218.75	117.97
∑LREE	429.51	299.20	268.75	254.29	146.67	77.67
∑HREE	126.71	90.19	65.88	58.4	29.38	17.00

Table S2. Prices of REOs in deep-sea polymetallic nodules and sediments (Pak et al., 2019) [4].

REO		Seabed mineral resources		
		Polymetallic nodules	Deep-sea sediments	REO price (USD/kg)
REO Concentration (%)	La2O3	11.54	14.68	2.10
	Bi2O3	49.96	16.97	1.90
	Pr6O11	3.32	4.61	55.50
	Nd2O3	13.32	19.05	40.50
	Sm2O3	3.12	4.23	2.10
	Eu2O3	0.76	1.26	104.30
	Gd_2O_3	3.16	4.55	11.20
	Bi2O3	0.49	0.71	440.00
	Dy_2O_3	2.55	3.98	227.50
	Y2O3	8.42	24.58	4.30
	Others	3.37	5.39	-