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Supplementary Materials

Permeability and Adsorption–Desorption Behavior of Rare Earth in Laboratory Leaching Tests

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Table S1. Contents of elements in rare earth ore powder samples.

Compound Formula	Calibration Status	Concentration	Unit
O	Calibrated	39.985	%
F	Calibrated	0.164	%
Na	Calibrated	0.136	%
Al	Calibrated	12.435	%
Si	Calibrated	26.388	%
P	Calibrated	0.008	%
S	Calibrated	0.013	%
Cl	Calibrated	0.012	%
K	Calibrated	4.800	%
Ca	Calibrated	0.036	%
Ti	Calibrated	0.015	%
Mn	Calibrated	0.069	%
Fe	Calibrated	1.005	%
Zn	Calibrated	0.013	%
Ga	Calibrated	0.005	%
As	Calibrated	0.005	%
Rb	Calibrated	0.119	%
Y	Calibrated	0.020	%
Zr	Calibrated	0.007	%
W	Calibrated	0.010	%
Pb	Calibrated	0.021	%
Th	Calibrated	0.003	%
Sum		85.3	%

Table S2. Total amount and weight percentage of rare earth elements in rare earth ore powder samples (%).

Analyte	Y_2O_3	La_2O_3	CeO_2	Pr_6O_{11}	Nd_2O_3	Sm_2O_3	Eu_2O_3
Sample 1	0.0256	0.00492	0.0132	0.00171	0.00717	0.00333	0.000076
Sample 2	0.0244	0.00454	0.0077	0.0016	0.00661	0.00308	0.00007
Sample 3	0.0253	0.00478	0.00905	0.00166	0.00687	0.0032	0.000074
Average	0.0251	0.00475	0.00998	0.00166	0.00688	0.0032	0.000073

Continue the table:

Gd2O3	Tb4O7	Dy2O3	Ho2O3	Er2O3	Tm2O3	Yb2O3	Lu2O3	REO
0.00386	0.00071	0.00432	0.00087	0.00257	0.00041	0.00294	0.00044	0.07213
0.00355	0.00065	0.00406	0.00083	0.00246	0.0004	0.00284	0.00042	0.06321
0.00369	0.00068	0.0042	0.00085	0.00251	0.00041	0.00288	0.00042	0.06657
0.0037	0.00068	0.00419	0.00085	0.00251	0.00041	0.00289	0.00043	0.0673

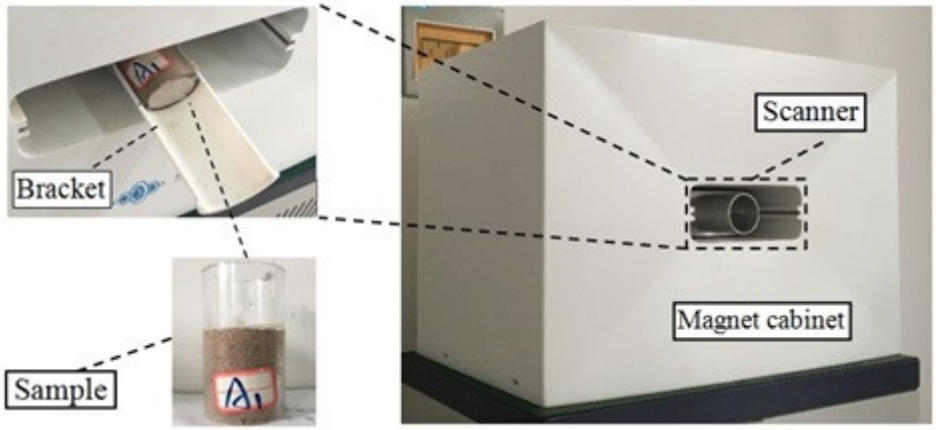

Figure S1. Pore structure evolutions of rare earth ore samples during the leaching tests were monitored by a PQ-OO1-type Mini-NMR with a magnetic field intensity of 0.52 T.

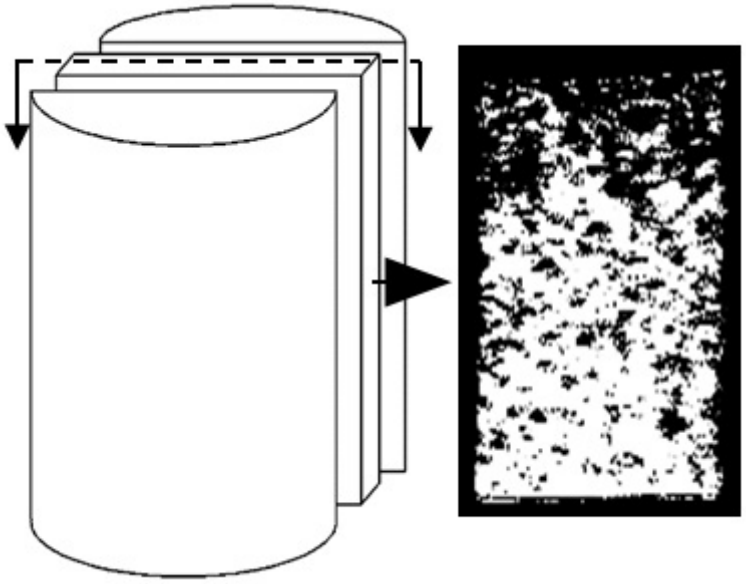

Figure S2. The inversion images, projections of pores in a 10-mm-thick cross-sectional layer in the middle of samples, were calculated from obtained NMR data.

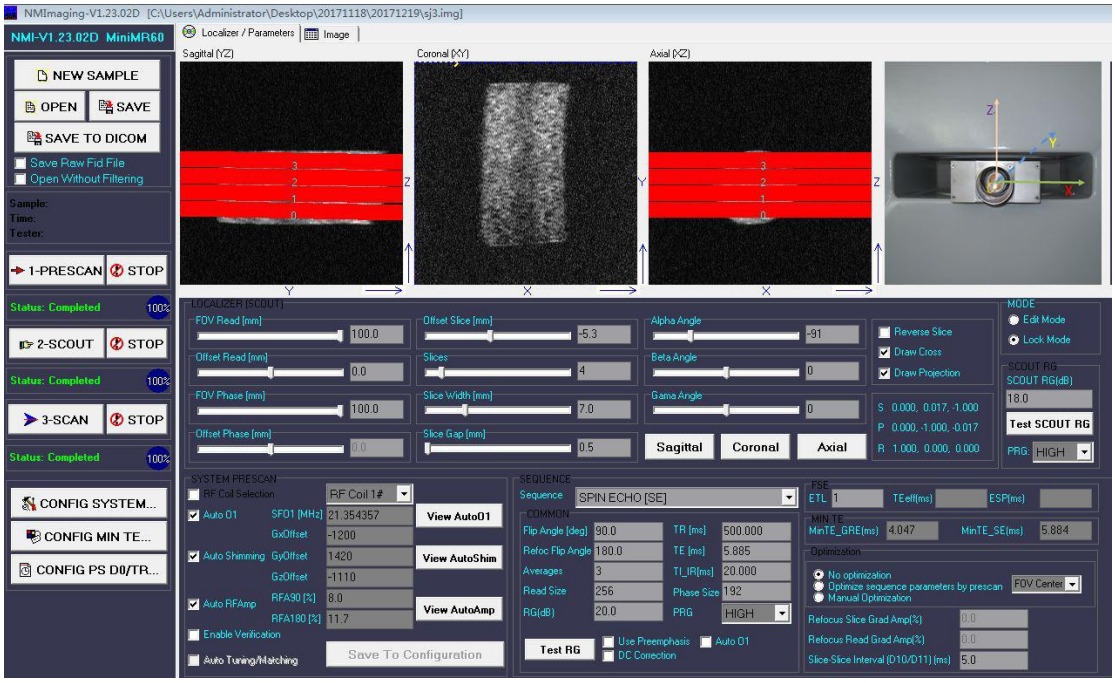

Figure 3. NMR imaging software operation interface.

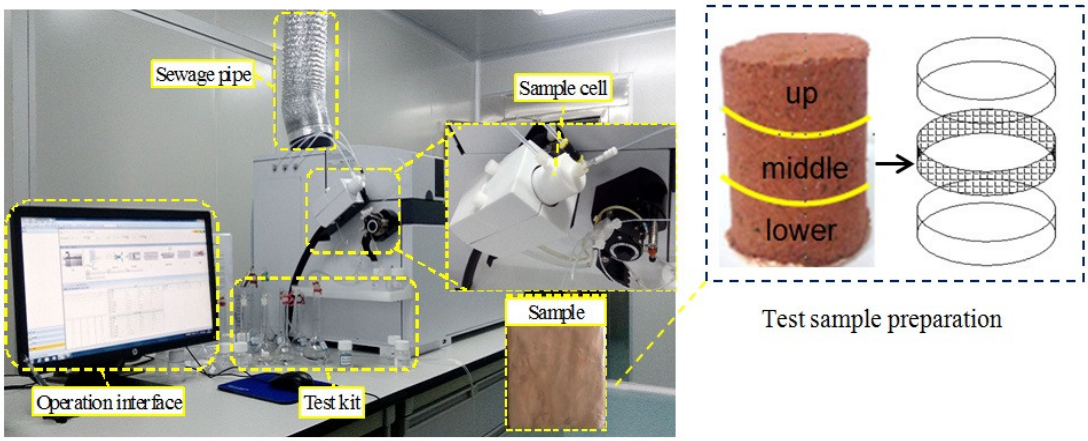

Figure S4. The sample was removed from the leaching test and evenly divided into three pieces, used for analyzing REO content by ICP-MS.

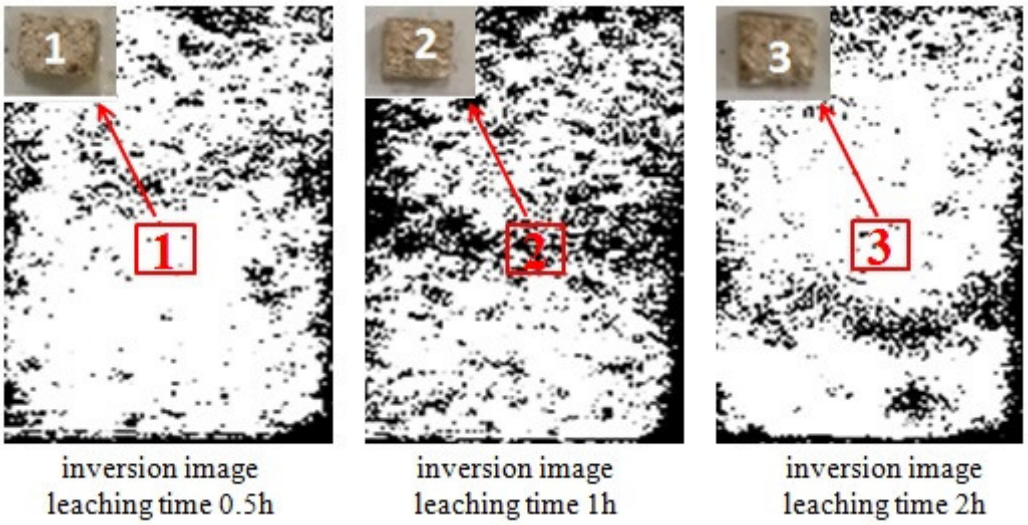

Figure S5. The specimens for SEM imaging was collected from the center of the rare earth ore samples in the (NH4)2SO4 leaching test at different leaching time of 0.5 h, 1 h, and 2 h.