

Supplementary Materials

Rare Earth Element Recovery from Acidic Extracts of Florida Phosphate Mining Materials Using Chelating Polymer 1-Octadecene, Polymer with 2,5-Furandione, Sodium Salt

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Table S1. Polymer Binding and Percent Rare Earth Element Recovery.

Amine Tailings

Element	mg REE per g solid	mg REE in solution per g solid at pH 1.5	mg REE bound by polymer per g of solid at pH 1.5	% Binding by polymer at pH 1.5	% Total REE Recovery
Cerium	0.0657	0.0168	0.0168	100 %	26 %
Dysprosium	0.0048	0.0032	0.0032	100 %	68 %
Erbium	0.0028	0.0020	0.0020	100 %	71 %
Gadolinium	0.0040	0.0032	0.0032	100 %	80 %
Holmium	0.0011	0.0006	0.0006	100 %	54 %
Lanthanum	0.0294	0.0140	0.0140	100 %	48 %
Neodymium	0.0397	0.0159	0.0159	100 %	40 %
Scandium	0.0015	0.0011	0.0011	100 %	75 %
Samarium	0.0049	0.0031	0.0031	100 %	64 %
Terbium	0.0014	0.0006	0.0006	100 %	42 %
Yttrium	0.0360	0.0212	0.0212	100 %	59 %
Ytterbium	0.0023	0.0015	0.0015	100 %	64 %
Praseodymium	0.0057	0.0005	0.0005	100 %	8 %
Uranium	0.0248	0.0039	0.0039	100 %	16 %
Thorium	0.0065	0.0013	0.0013	100 %	20 %

Phosphogypsum

Element	mg REE per g solid	mg REE in solution per g solid at pH 1.5	mg REE bound by polymer per g of solid at pH 1.5	% Binding by polymer at pH 1.5	% Total REE Recovery
Cerium	0.0480	0.0159	0.0159	100 %	33 %
Dysprosium	0.0044	0.0027	0.0027	100 %	60 %
Erbium	0.0025	0.0014	0.0014	100 %	57 %
Gadolinium	0.0057	0.0030	0.0030	100 %	53 %
Holmium	0.0011	0.0006	0.0006	100 %	55 %
Lanthanum	0.0265	0.0143	0.0143	100 %	54 %
Neodymium	0.0303	0.0174	0.0174	100 %	57 %
Samarium	0.0045	0.0022	0.0022	100 %	49 %
Terbium	0.0008	0.0005	0.0005	100 %	70 %
Yttrium	0.0340	0.0210	0.0210	100 %	62 %
Ytterbium	0.0016	0.0008	0.0008	100 %	52 %
Praseodymium	0.0058	0.0004	0.0004	100 %	7 %
Uranium	0.0315	0.0090	0.0073	82 %	23 %
Thorium	0.0012	0.0003	0.0003	100 %	26 %

Phosphate Rock

Element	mg REE per g solid	mg REE in solution per g solid at pH 1.5	mg REE bound by polymer per g of solid at pH 1.5	% Binding by polymer at pH 1.5	% Total REE Recovery
Cerium	0.1302	0.0381	0.0381	100 %	29 %
Dysprosium	0.0136	0.0051	0.0051	100 %	37 %
Erbium	0.0095	0.0035	0.0035	100 %	37 %
Gadolinium	0.0164	0.0058	0.0058	100 %	35 %
Holmium	0.0031	0.0008	0.0008	100 %	27 %
Lanthanum	0.0770	0.0310	0.0310	100 %	40 %
Lutetium	0.0014	0.0003	0.0003	100 %	22 %
Neodymium	0.0846	0.0413	0.0413	100 %	49 %
Scandium	0.0049	0.0027	0.0027	100 %	56 %
Samarium	0.0118	0.0053	0.0053	100 %	45 %
Terbium	0.0022	0.0009	0.0009	100 %	43 %
Yttrium	0.1306	0.0358	0.0358	100 %	27 %
Ytterbium	0.0086	0.0027	0.0027	100 %	32 %
Praseodymium	0.0081	0.0012	0.0012	100 %	15 %
Uranium	0.0885	0.0329	0.0274	83 %	31 %
Thorium	0.0094	0.0000	0.0000	N/A*	N/A

*N/A = Not Applicable; – Calculation cannot be performed.

Waste Clay

Element	mg REE per g solid	mg REE in solution per g solid at pH 1.5	mg REE bound by polymer per g of solid at pH 1.5	% Binding by polymer at pH 1.5	% Total REE Recovery
Cerium	0.0860	0.0267	0.0267	100 %	31 %
Dysprosium	0.0072	0.0048	0.0048	100 %	66 %
Erbium	0.0046	0.0031	0.0031	100 %	67 %
Gadolinium	0.0101	0.0047	0.0047	100 %	47 %
Holmium	0.0018	0.0010	0.0010	100 %	54 %
Lanthanum	0.0417	0.0181	0.0181	100 %	43 %
Lutetium	0.0008	0.0003	0.0003	100 %	42 %
Neodymium	0.0537	0.0217	0.0217	100 %	40 %
Scandium	0.0061	0.0033	0.0033	100 %	55 %
Samarium	0.0063	0.0048	0.0048	100 %	77 %
Terbium	0.0016	0.0009	0.0009	100 %	59 %
Yttrium	0.0602	0.0327	0.0327	100 %	54 %
Ytterbium	0.0043	0.0025	0.0025	100 %	58 %
Praseodymium	0.0026	0.0008	0.0008	100 %	31 %
Uranium	0.0665	0.0311	0.0311	100 %	47 %
Thorium	0.0059	0.0022	0.0022	100 %	38 %