

Supplementary Materials: Alkali-Hydrothermal Treatment of K-Rich Igneous Rocks for Their Direct Use as Potassic Fertilizers

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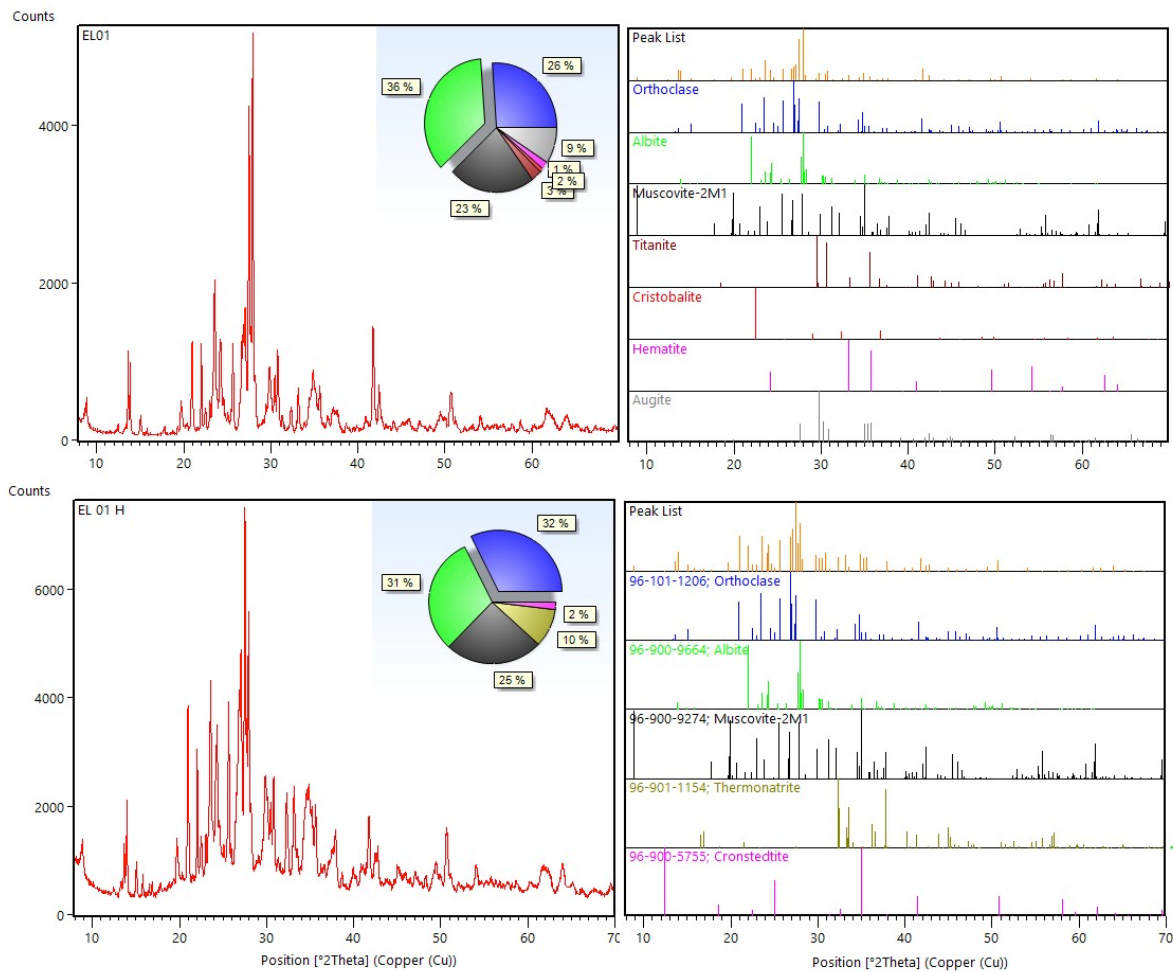


Figure S1. XRD pattern of trachyte treated sample EL01 and EL01H.

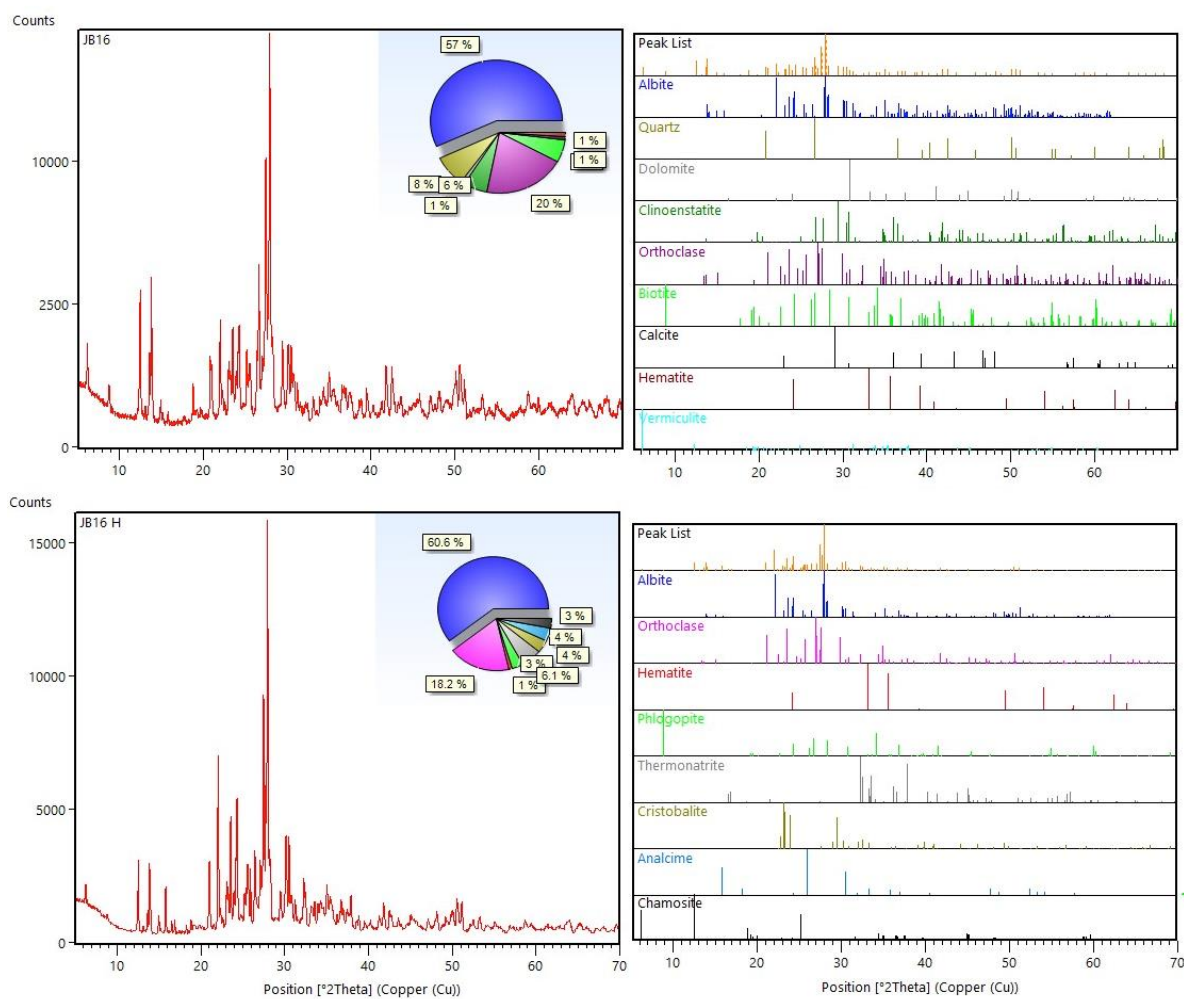


Figure S2. XRD pattern of trachyte treated sample JB16 and JB16H.

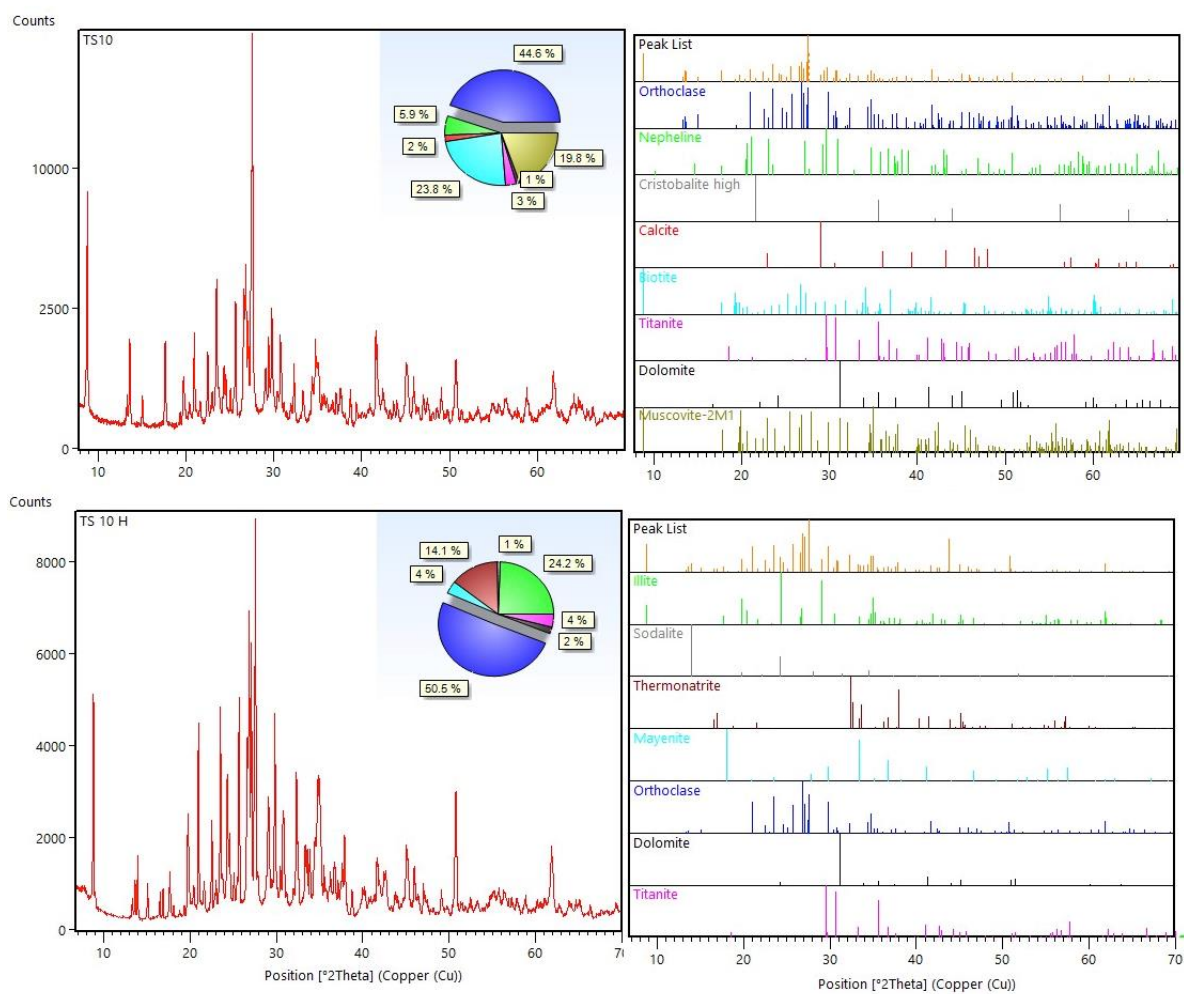


Figure S3. XRD pattern of trachyte treated sample TS10 and TS10H.

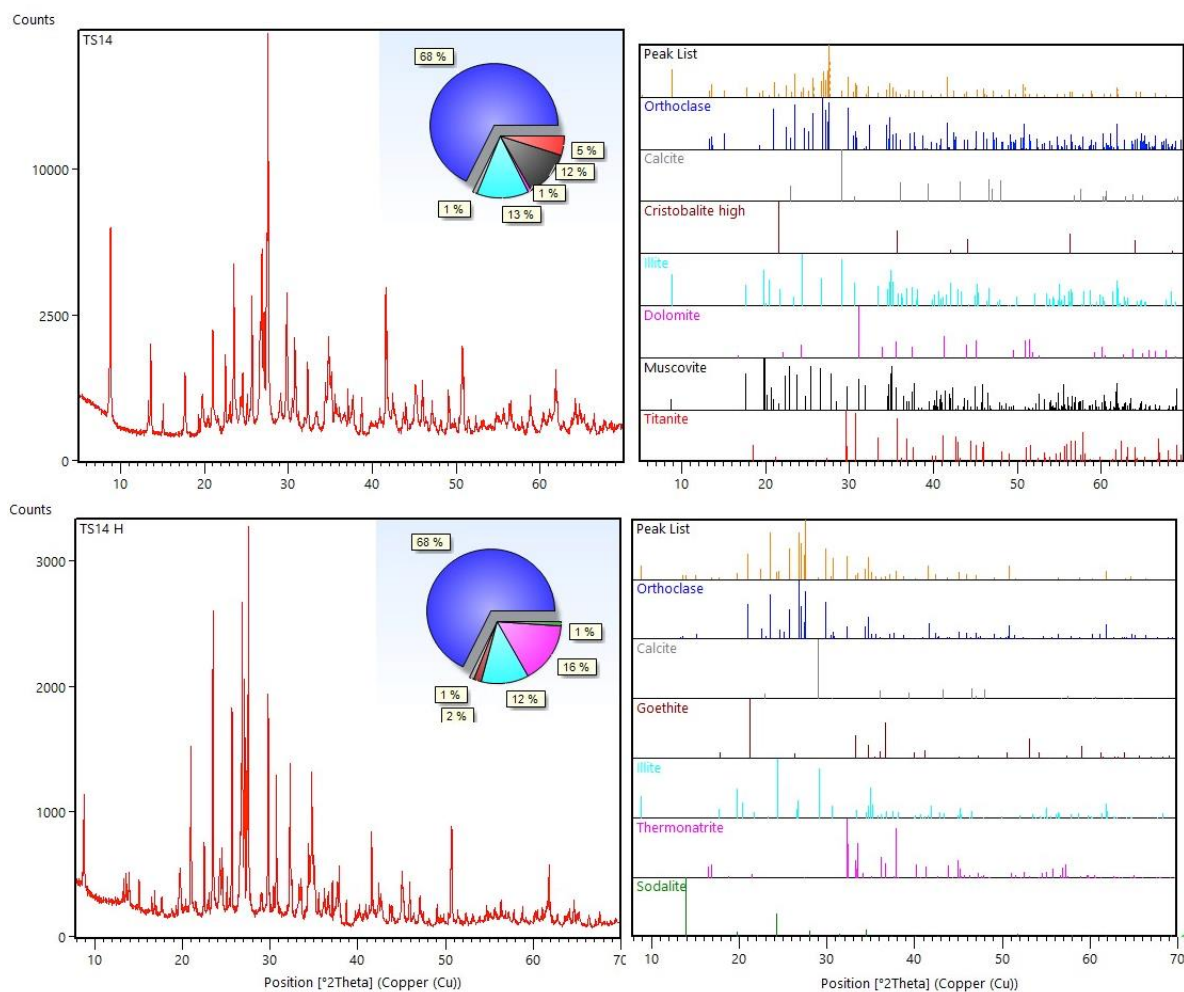


Figure S4. XRD pattern of trachyte treated sample TS14 and TS14H.

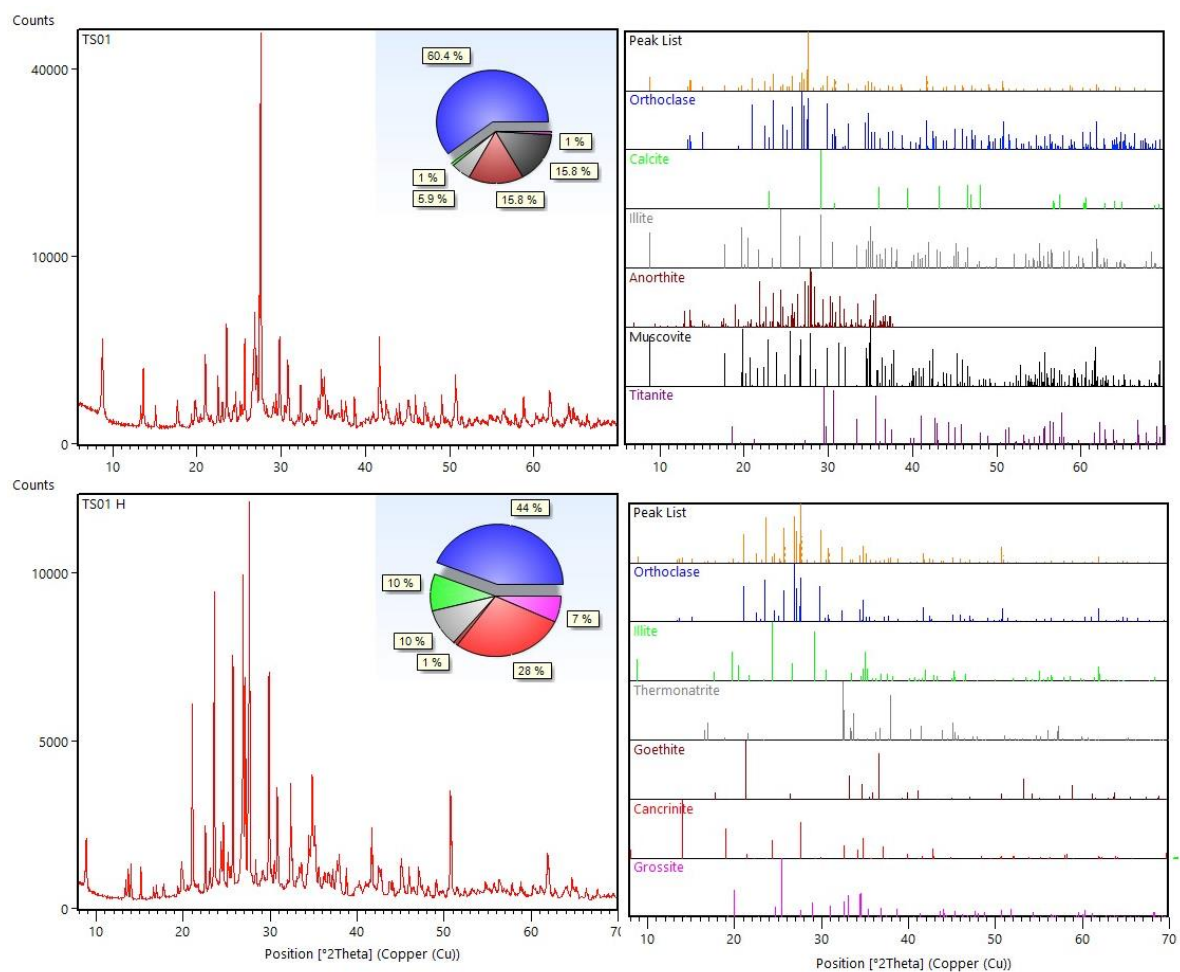


Figure S5. XRD pattern of trachyte treated sample TS01 and TS01H.

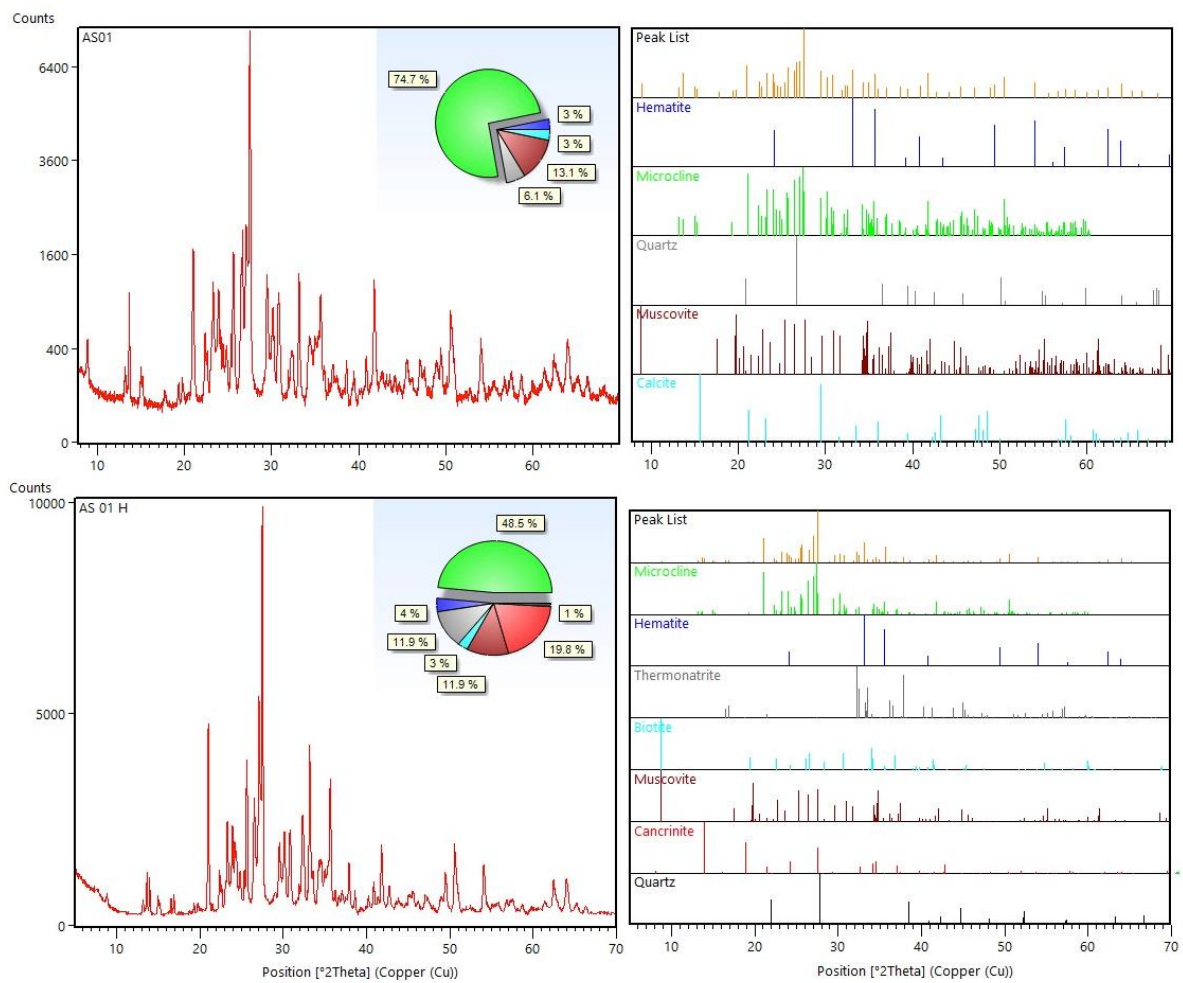


Figure S6. XRD pattern of trachyte treated sample AS01 and AS01H.

Table S1. Leaching tests results of treated and raw materials.

Materials	Element	Al	Ca	Fe	K	Mg	Mn	P	Si
	Samples	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Raw materials	AS01	0.119	11.2	0.033	40.7	1.6	0.019	0.078	8.2
	EL01	0.054	31.4	0.013	33.3	3.6	0.026	0.023	7
	JB16	0.168	10.9	<10	20.7	1.9	0.01	0.036	4,6
	TS 01	0.075	17.6	0.023	30.7	1.2	0.016	0.049	5,4
	TS 10	0.035	10.4	<10	36.7	0.7	<10	0.016	5,5
	TS 14	0.804	3.5	0.413	55.3	0.5	0.048	0.332	6,2
Treated materials	AS01 H	4.9	70.4	14.4	959.4	11.6	0.1	15.1	1483.1
	EL 01 H	3.5	62.7	15	469.5	11.1	0.2	1.7	2018
	JB 16 H	5.6	66.4	20.8	218.6	11.8	0.3	3	2048.7
	TS 01 H	4.9	68.1	14.3	932.3	11	0.1	1.4	1119.6
	TS10 H	2.8	62	8.5	1278.5	11.6	0.1	1.2	1473
	TS 14 H	3.8	60.6	7	1206.5	10.4	0.2	10.3	2759.6

Table S2. Potassium extraction percentage for each material (raw and treated samples).

Materials	Element Samples	Al %	Ca %	Fe %	K %	Mg %	Mn %	P %	Si %
Raw materials	AS01	0.004	0.039	0.001	1.685	0.0004	0.00001	0.000051	0.752
	EL01	0.002	0.042	0.0002	0.819	0.0065	0	0.000004	0.526
	JB16	0.006	0.035	0	0.367	0.0039	0.000003	0.000012	0.452
	TS 01	0.003	0.047	0.0003	1.099	0.0011	0.00001	0	0.426
	TS 10	0.002	0.025	0	1.451	0.0002	0	0	0.442
	TS 14	0.037	0.008	0.004	2.272	0.0001	0.00003	0.000054	0.526
Treated materials	AS01 H	0.154	0.245	0.001	39.720	0.003	0.00001	0.00005	0.75168
	EL 01 H	0.113	0.084	0.0002	11.546	0.020	0	1	2
	JB 16 H	0.186	0.214	0	3.879	0.024	0.000003	0.000012	0.451508
	TS 01 H	0.167	0.183	0.0003	33.375	0.010	0.000009	0	0.425918
	TS10 H	0.135	0.150	0	50.544	0.003	0	0	0.442
	TS 14 H	0.175	0.130	0.004	49.575	0.002	0.00003	0.00005	0.52597