Supplementary data

Table 10. Reference codes and labels in the XRD graph to detect compounds.

Marked as in XRD-graph	Ref. Code	Combound name
1a	04-026-3594	Calcium Aluminum Silicate Hydroxide
1b	04-026-3595	Calcium Aluminum Silicate Hydroxide
1c	00-042-0570	Calcium Aluminum Silicate Hydroxide
2	00-024-0217	Calcium Aluminum Hydroxide
3a	00-033-0302	Calcium Silicate
3b	00-033-0303	Calcium Silicate
3c	00-006-0476	Calcium Silicate
4	04-023-2764	Sodium Calcium Silicate
5	04-024-1422	Calcium Magnesium Silicate
6	01-080-2856	Magnesium Hydroxide
7	04-023-8423	Calcium Magnesium Manganese Aluminum Iron Silicon Oxide Hydroxide
8a	00-020-0231	Calcium Oxalate Hydrate
8b	00-020-0233	Calcium Oxalate Hydrate
9	00-048-1882	Calcium Aluminum Oxide
10	01-086-2334	Calcium Carbonate
11	04-013-1277	Magnesium Aluminum Silicon Oxide
12	04-026-8811	Calcium Zinc Aluminum Oxide
13	04-024-2971	Calcium Oxalate Hydrate (Zinc doped)
14	01-090-1334	Potassium Sodium Calcium Zinc Sulfate
15	01-070-2950	Aluminum Iron Magnesium Zinc Silicate Hydroxide

Table 11. Design matrix and responses (pH, concentration, adsorbent dosage) in the zinc adsorption optimization.

Exp No	Exp Name	Run Order	Incl/Excl	pH	Concentration (mg/l)	Dosage (g/l)	q (mg/g)	R-%
1	N1	15	Incl	4.09	90.14	1.99	18.02	39.7
2	N2	7	Incl	5.97	88.62	2.01	17.97	40.7
3	N3	4	Incl	4.09	487.24	2	78.28	32.1
4	N4	11	Incl	6.07	493.62	1.99	78.96	31.8
5	N5	2	Incl	4.09	90.14	10.05	8.72	97.1
6	N6	14	Incl	5.97	88.62	10.02	8.59	97.2
7	N7	12	Incl	4.09	487.24	10.02	26.66	54.8
8	N8	17	Incl	6.07	493.62	10.03	26.88	54.6
9	N9	13	Incl	4.02	281.32	6.04	22.31	47.9
10	N10	1	Incl	6.07	281	6.04	22.01	47.3
11	N11	3	Incl	4.97	89.69	6.01	12.45	83.5
12	N12	6	Incl	4.87	478.23	6.04	40.34	50.9
13	N13	10	Excl	5.01	276.33	2.02	49.34	36.1
14	N14	8	Excl	5.01	276.33	10.03	16.83	61.1
15	N15	9	Incl	5.01	276.33	6.01	21.86	47.5
16	N16	5	Incl	5.01	276.33	5.99	22.35	48.5
17	N17	16	Incl	5.01	276.33	6.02	21.35	46.5