Supplementary Information for

Metal (hydr)oxide surface precipitates and their effects on potassium sorption

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Table of Contents

Table S1 – Tabulation of energy values (positions) of different XANES spectral features of analyzed samples. No significant features could be observed in the pre-edge region (3600-3608 eV) of any samples.

Figure S1 – Transmission Electron Microscopy (TEM) images of non-reacted silicon (S1a) and gamma aluminum oxide (S1b and S1c). S1b is an overview of ɣ-Al_2O_3. Figure S1c indicates the crystalline nature of ɣ-Al_2O_3 via the presence of lattice fringes (d-spacing = 4.6 Å). The lattice fringe measurement of 2.3 nm is for 5 lattice fringes.

Figure S2 – An overview (S2a) and high resolution (S2b) Transmission Electron Microscopy (TEM) images from gamma aluminum oxide reacted with zinc for one month (AlZn1M). The d-spacing value of the lattice fringes in the darker regions was found to be 2.5 and 2.6 Å, which corresponds to that of zaccagnaite. The different d-spacing value that corresponds to ɣ-Al_2O_3 are 4.58, 2.8, and 2.39.

Figure S3 – Transmission Electron Microscopy (TEM) images from the mixed mineral systems ɣ-Al_2O_3 and SiO_2 reacted with zinc for one month (SiAlZn1M). Figure S3a is an overview image. Figures S3b and S3c are high resolution.

Figure S4 – Energy-dispersive X-ray (EDX) spectra obtained from AlZn1M from select regions of ɣ-Al_2O_3, zaccagnaite, empty space, and the Lacey support.

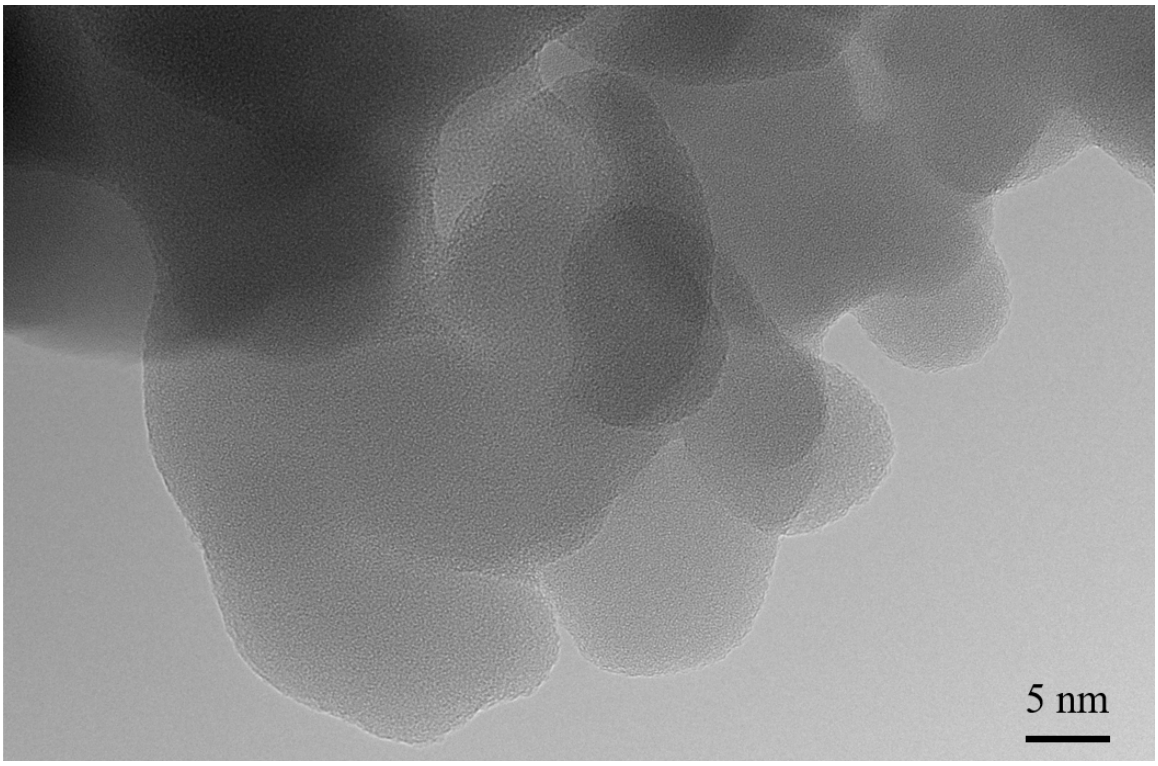
Figure S5 – Energy-dispersive X-ray (EDX) spectra obtained from AlZn1M from select regions of ɣ-Al_2O_3, SiO_2, and zaccagnaite-rich regions.

Table S1: Tabulation of energy values (positions) of different XANES spectral features of analyzed samples. No significant features could be observed in the pre-edge region (3600-3608 eV) of any samples.

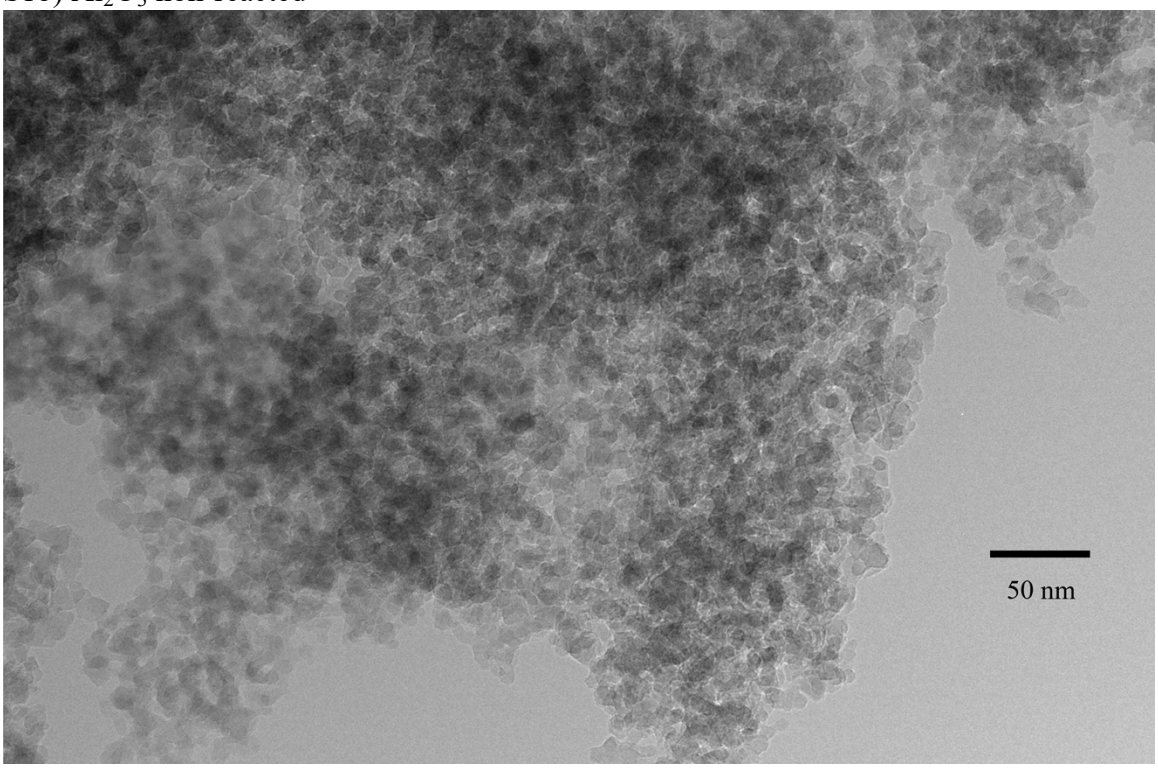
		Edge (3608 – 3616 eV)		White line peak position (3614 – 3617 eV)	Post-edge (3617 – 3660 eV)				
	Sample ID	1st shoulder	2nd shoulder	Peak	First valley	Peak	Second valley	Shoulder	Peak
1	SiAlNi1M	subtle (3610.9)	distinct (3613)	sharp (3616)	-	-	-	distinct (3636.4)	broad (3644.6)
2	SiAlZn1M	subtle (3610.9)	distinct (3613)	sharp (3616)	-	-	-	distinct (3636.4)	broad (3644.3)
3	SiAlMg1W	distinct (3610.8)	subtle (3613.7)	sharp (3616)	-	-	-	distinct (3636.4)	broad (3646.5)
4	SiAlMg1M	distinct (3610.8)	subtle (3613.7)	sharp (3616)	-	-	-	subtle (3636.4)	broad (3645.3)
5	SiAl1W	distinct (3610.8)	distinct (3613.6)	round (3616)	-	-	-	subtle (3636.4)	broad (3644.9)
6	SiAl1M	subtle (3610.8)	distinct (3613.6)	round (3616)	-	-	-	distinct (3636.4)	broad (3645.4)
7	SiNi1M	distinct (3610.8)	subtle (3613)	sharp (3616)	-	-	-	distinct (3636.4)	broad (3645.6)
8	SiZn1M	distinct (3610.8)	subtle (3614)	round (3616)	-	-	-	distinct (3636.4)	broad (3645.1)
9	SiMg1W	distinct (3610.8)	subtle (3614)	round (3616)	-	-	-	distinct (3636.4)	broad (3645.9)
10	SiMg1M	distinct (3610.8)	distinct (3614)	sharp (3616)	-	-	-	distinct (3636.4)	broad (3645.4)
11	AlNi1M	subtle (3610.4)	subtle (3612.2)	round (3615.4)	shallow (3625.4)	subtle, broad (3628.4)	shallow (3632.4)	distinct (3636.4)	broad (3643.6)
12	AlZn1M	subtle (3610.5)	-	sharp (3615.4)	deep (3624.5)	broad (3628.4)	deep (3632.4)	subtle (3636.4)	broad (3643.6)
13	AlMg1W	subtle (3610.4)	-	round (3616)	-	subtle, broad (3628.4)	-	subtle (3636.4)	broad (3643.4)
14	AlMg1M	subtle (3610.7)	-	sharp (3615.4)	deep (3624.5)	sharp (3628.4)	deep (3632.4)	subtle (3636.4)	broad (3643.4)

Figure S1. Transmission Electron Microscopy (TEM) images of non-reacted silicon (S1a) and gamma aluminum oxide (S1b and S1c). S1b is an overview of ɣ-Al_2O_3. Figure S1c indicates the crystalline nature of ɣ-Al_2O_3 via the presence of lattice fringes (d-spacing = 4.6 Å). The lattice fringe measurement of 2.3 nm is for 5 lattice fringes.

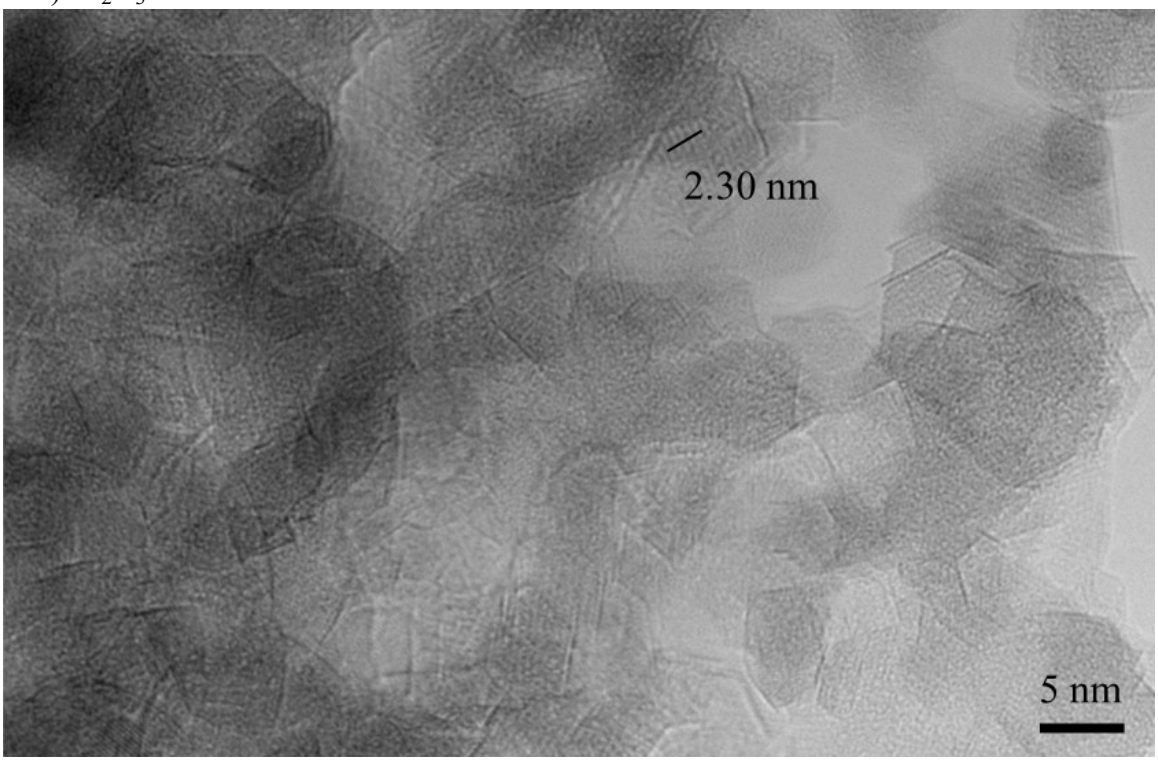
S1a) SiO_2 non-reacted



S1b) Al_2O_3 non-reacted



S1c) Al_2O_3 non-reacted



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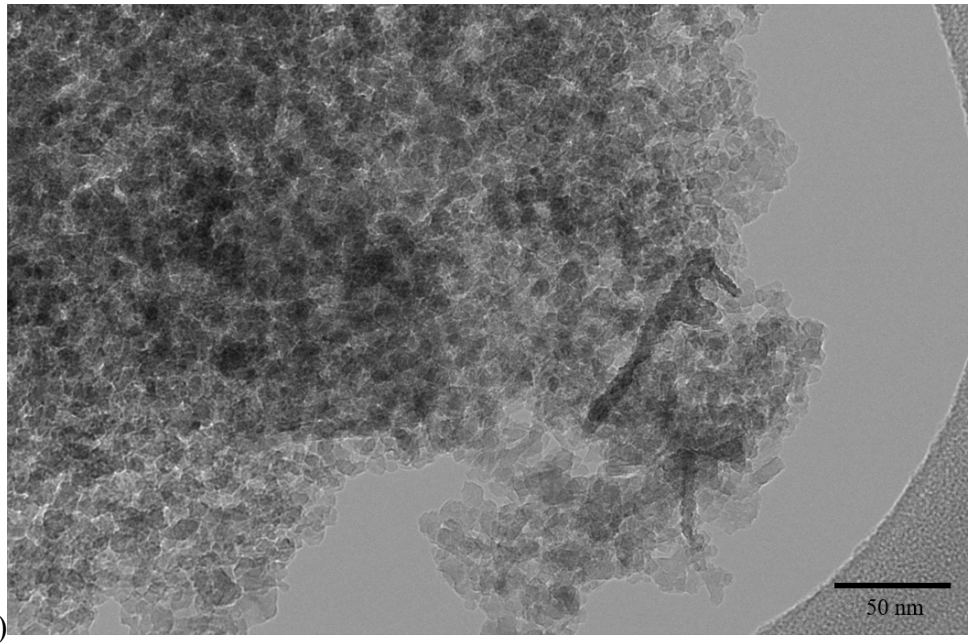
S2a)



S2b)

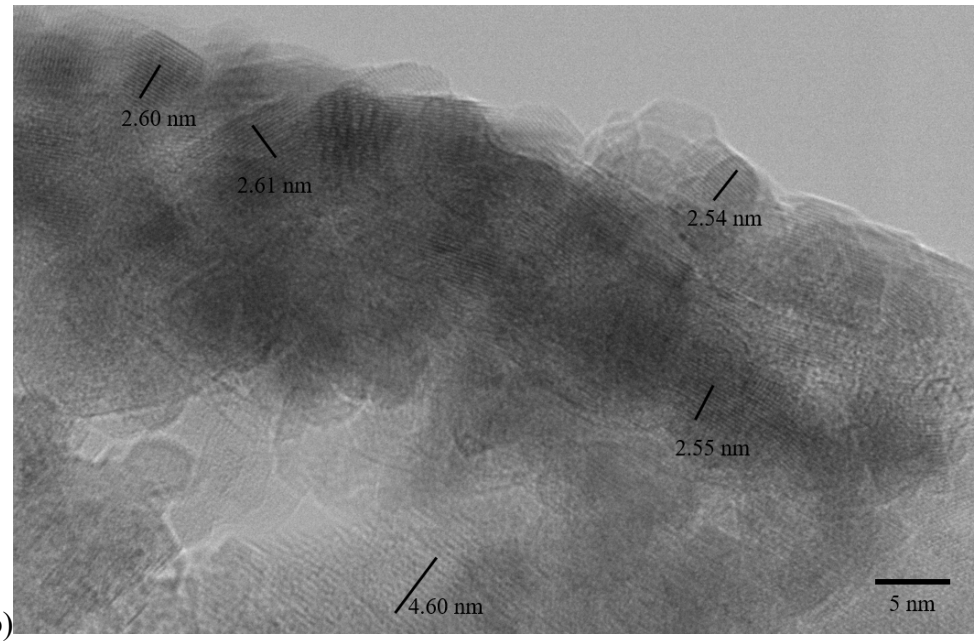
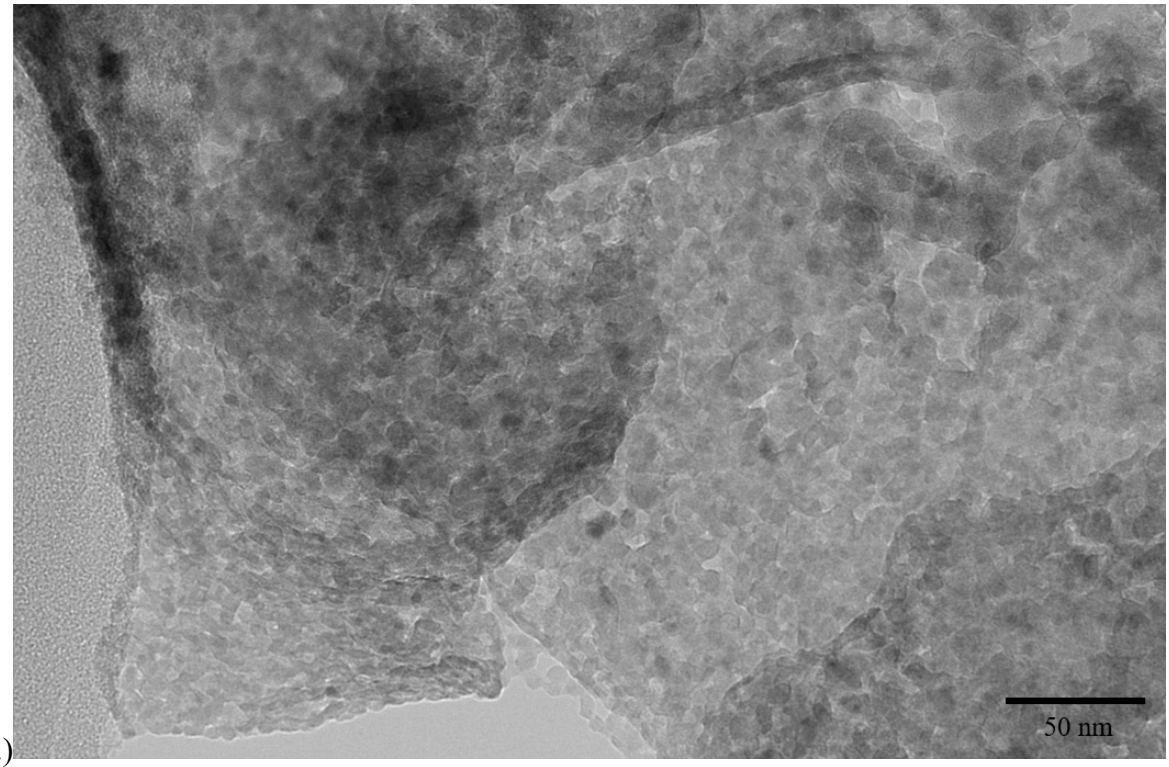
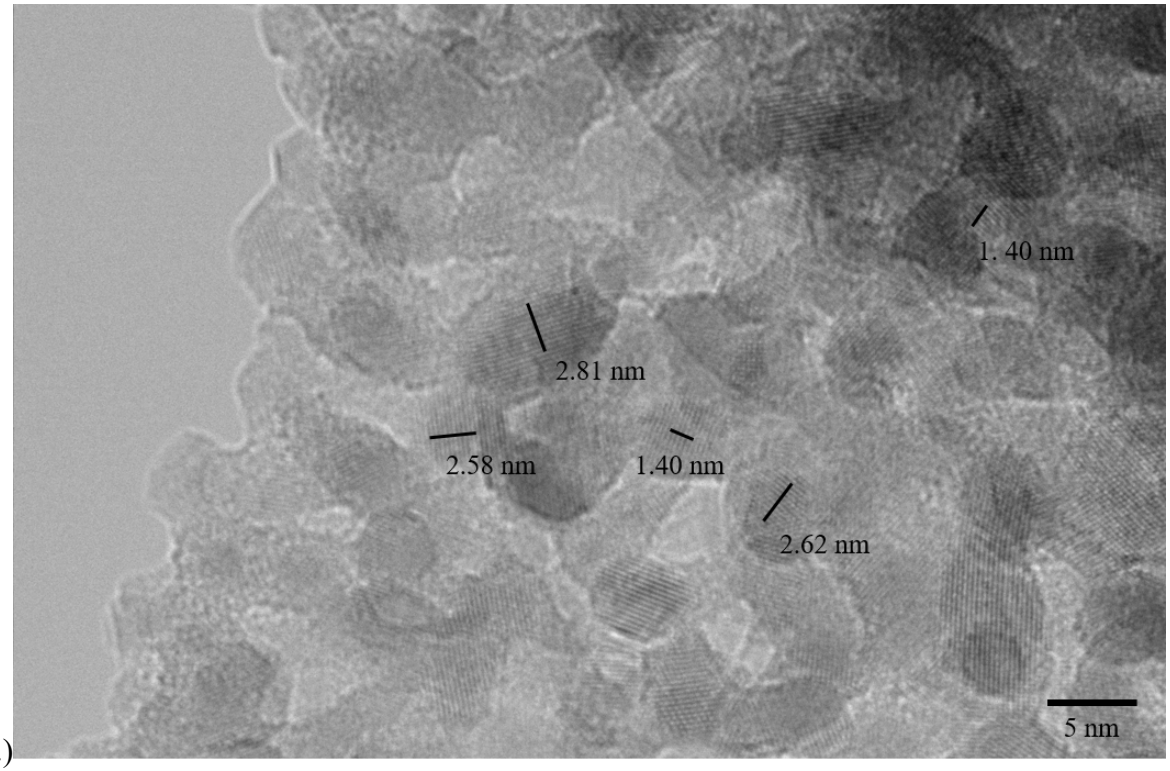


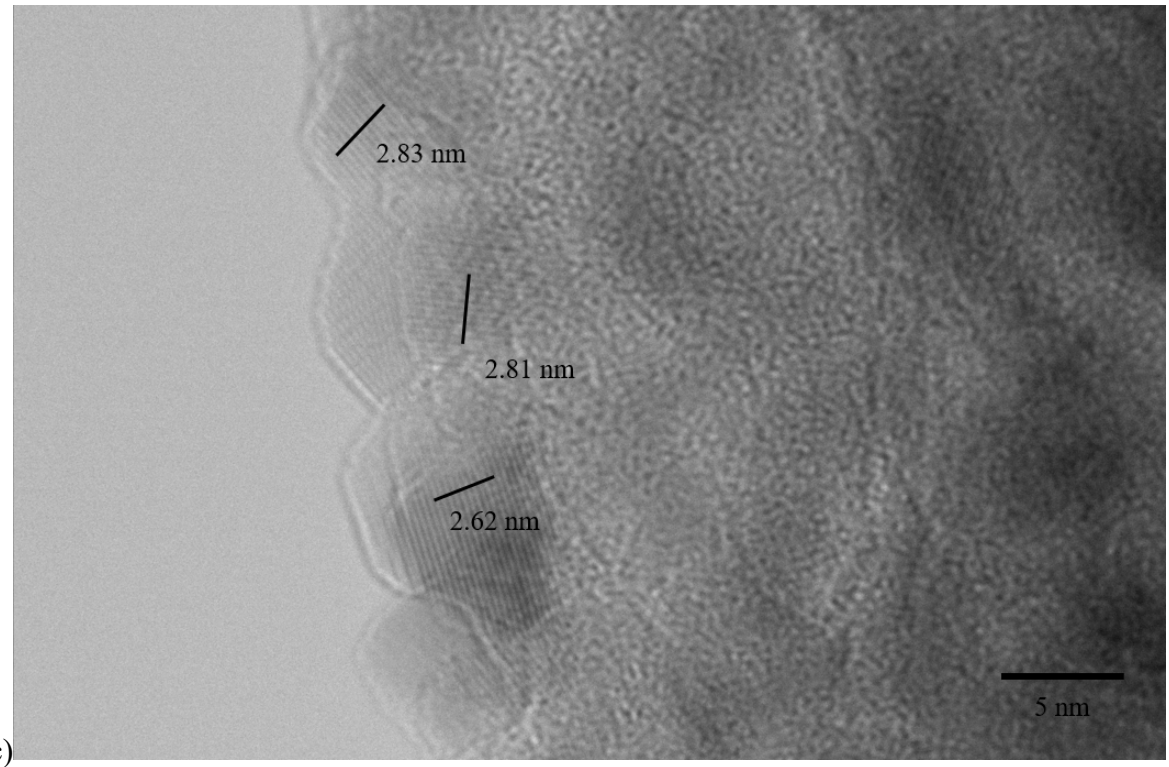
Figure S3: Transmission Electron Microscopy (TEM) images from the mixed mineral systems ɣ-Al_2O_3 and SiO_2 reacted with zinc for one month (SiAlZn1M). (S3a) is an overview image; (S3b) and (S3c) are high resolution images.

S3a.)



S3b.)





S3c)

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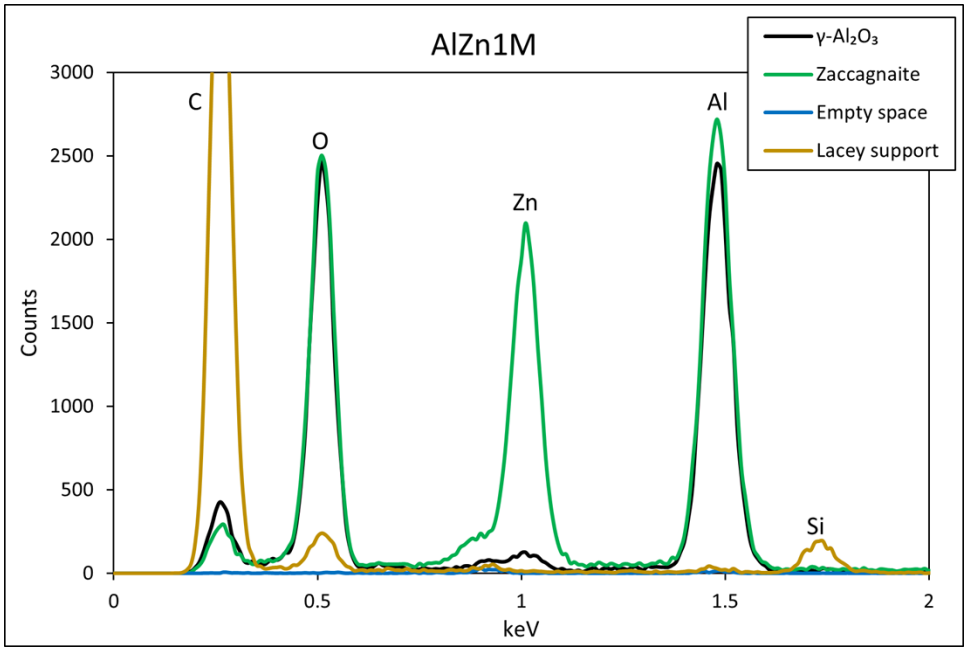

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