Supplement of

Comparing the ice nucleation properties of the kaolin minerals kaolinite and halloysite

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Particle size analysis by means of laser diffraction analysis

We show the particle number size distribution of the second microcline sample. The measurement was conducted with a Beckman Coulter LS 13320 particle size analyser.

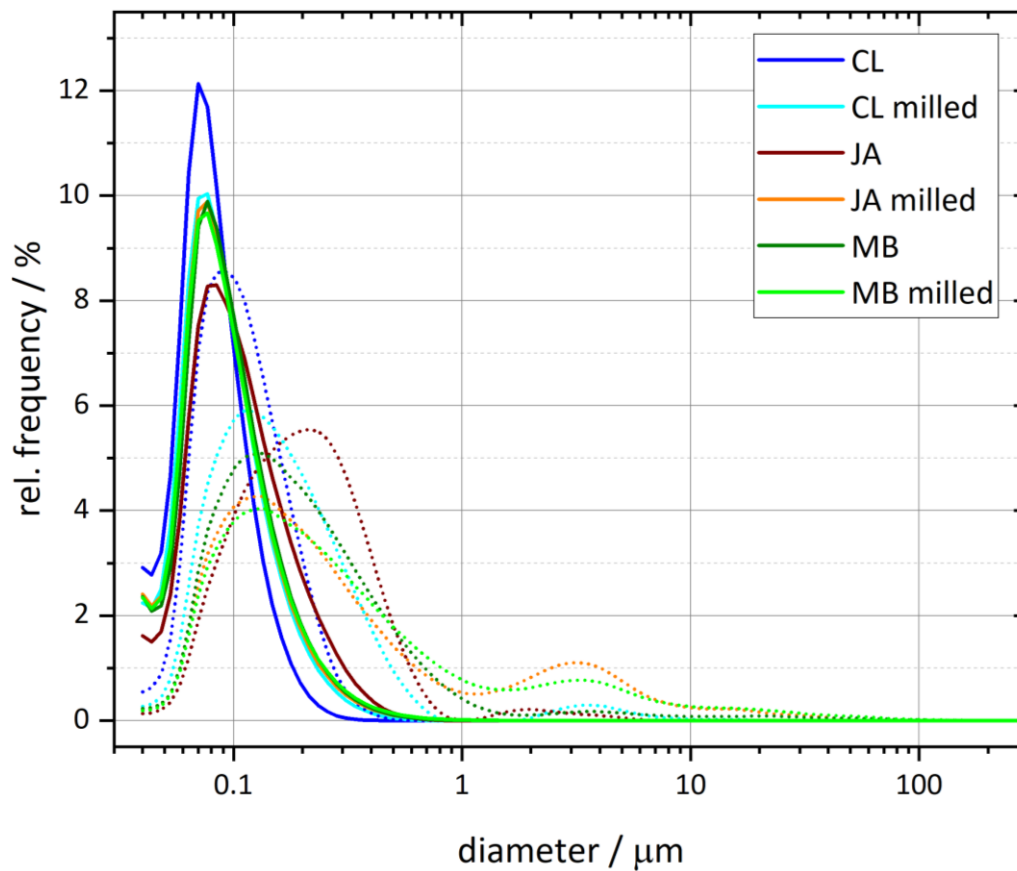
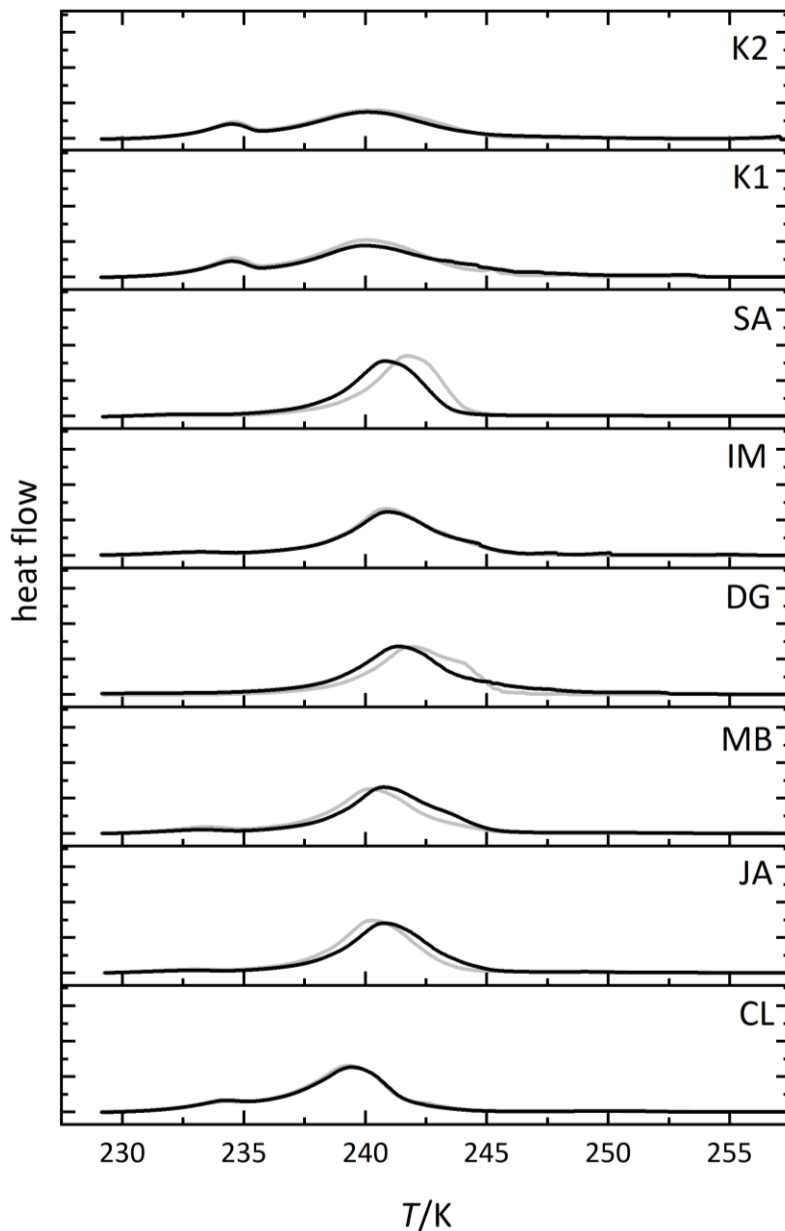



Figure S1: Particle number size distribution (solid lines) and Particle surface area distribution (dotted lines) for untreated halloysite samples (darker colours) and milled samples (lighter colours). Plotted are the frequency in percent against the equivalent volume diameter *r*.

35 **DSC thermograms of of immersion freezing experiments of emulsified microcline suspensions in 0.2 M ammonia solution**

We show DSC thermograms (cooling rate: 1 K/min) for freshly prepared emulsions of 0.2 %(wt) suspensions in 0.2 M ammonia solutions.

40 **Figure S2:** Thermograms from immersion freezing experiments of emulsified 0.2 wt% dust suspensions in 0.2 M aqueous ammonia solutions. The corresponding repetition of the experiment is shown in grey. The curves are normalized with respect to their total integral. Note that spikes occurring before the heterogeneous freezing signal originate from single large emulsion droplets and are not representative of ice nucleation by halloysite/kaolinite.

DVS isotherms of halloysite and kaolinite samples

45   We show sorption isotherms of all samples used in this study.

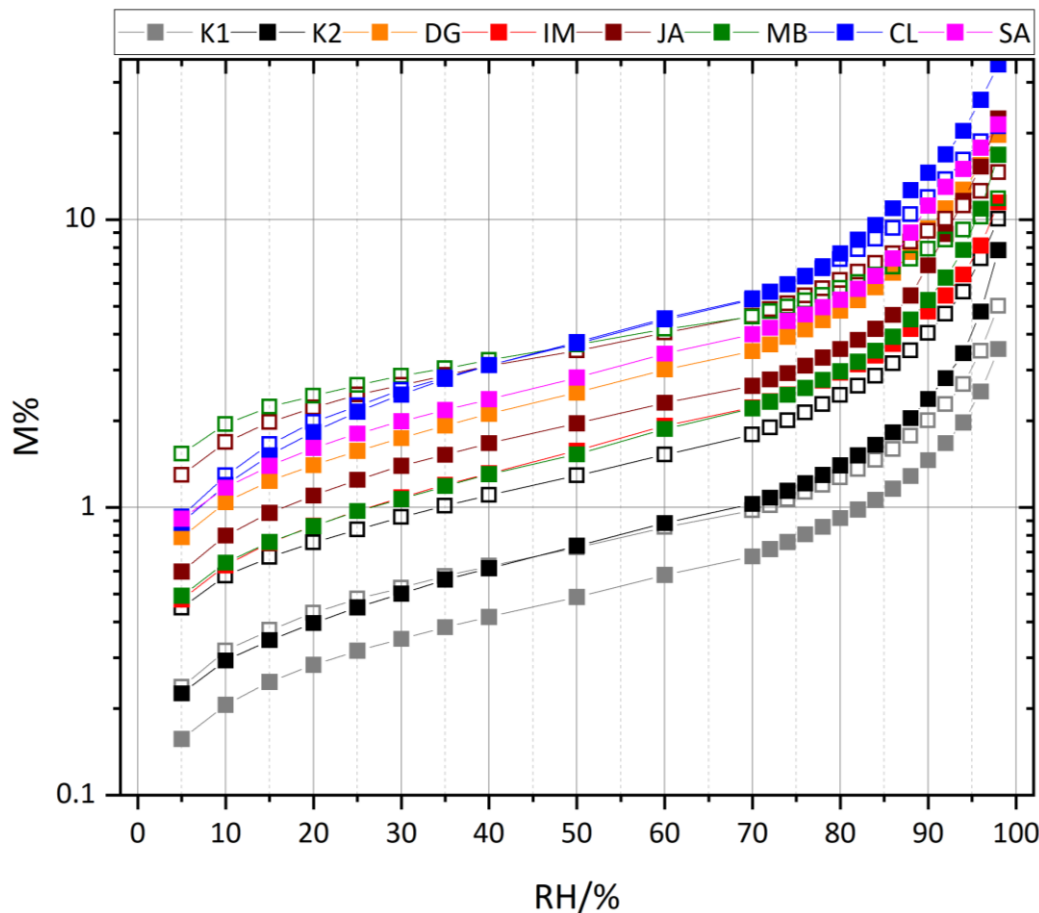



Figure S3: Sorption isotherms of all samples used in this study. Plotted are the percental mass gain on logarithmic scale against the relative humidity. Open samples show the corresponding milled samples.

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TEM micrographs of untreated and milled samples

We show all recorded TEM micrographs of untreated and milled halloysite samples as well as the untreated K2 sample

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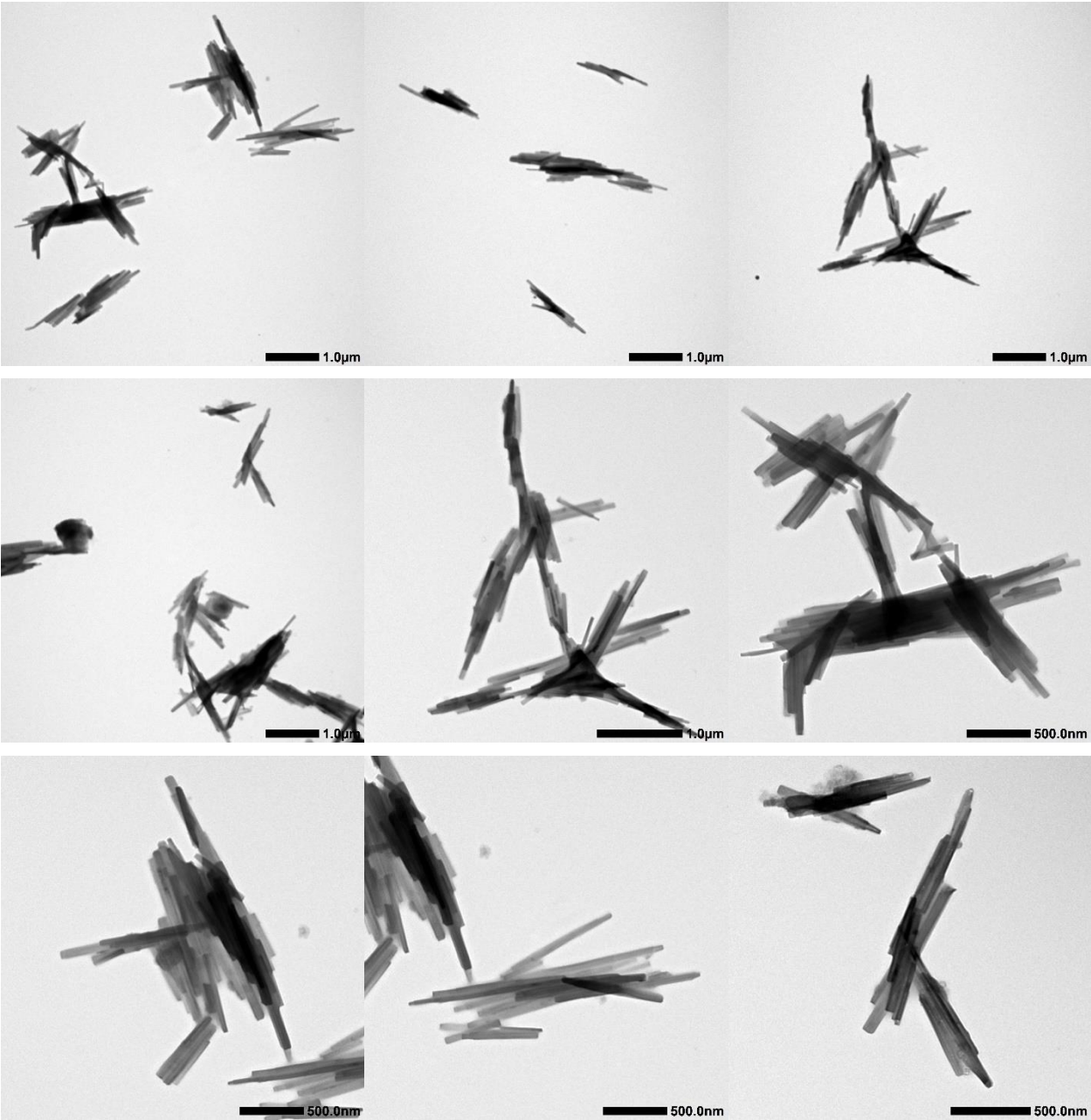
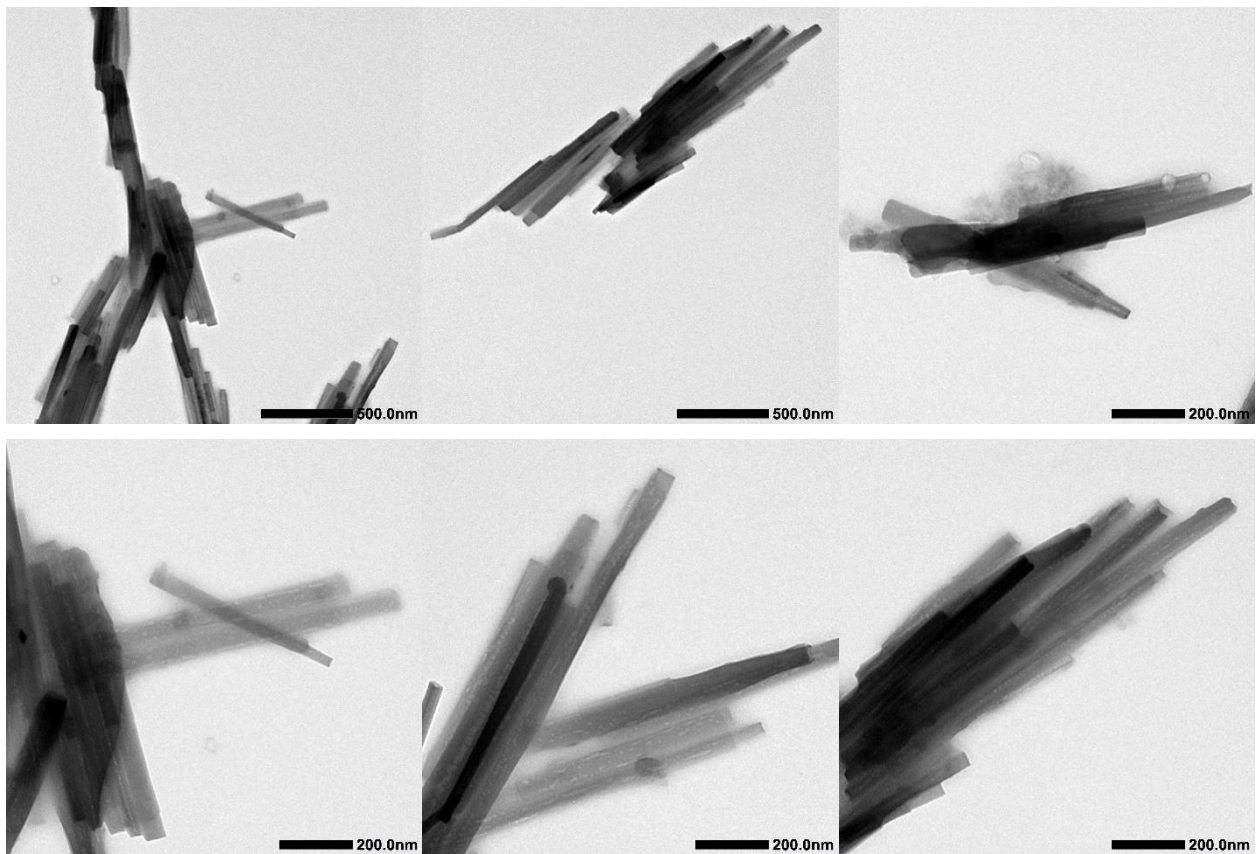
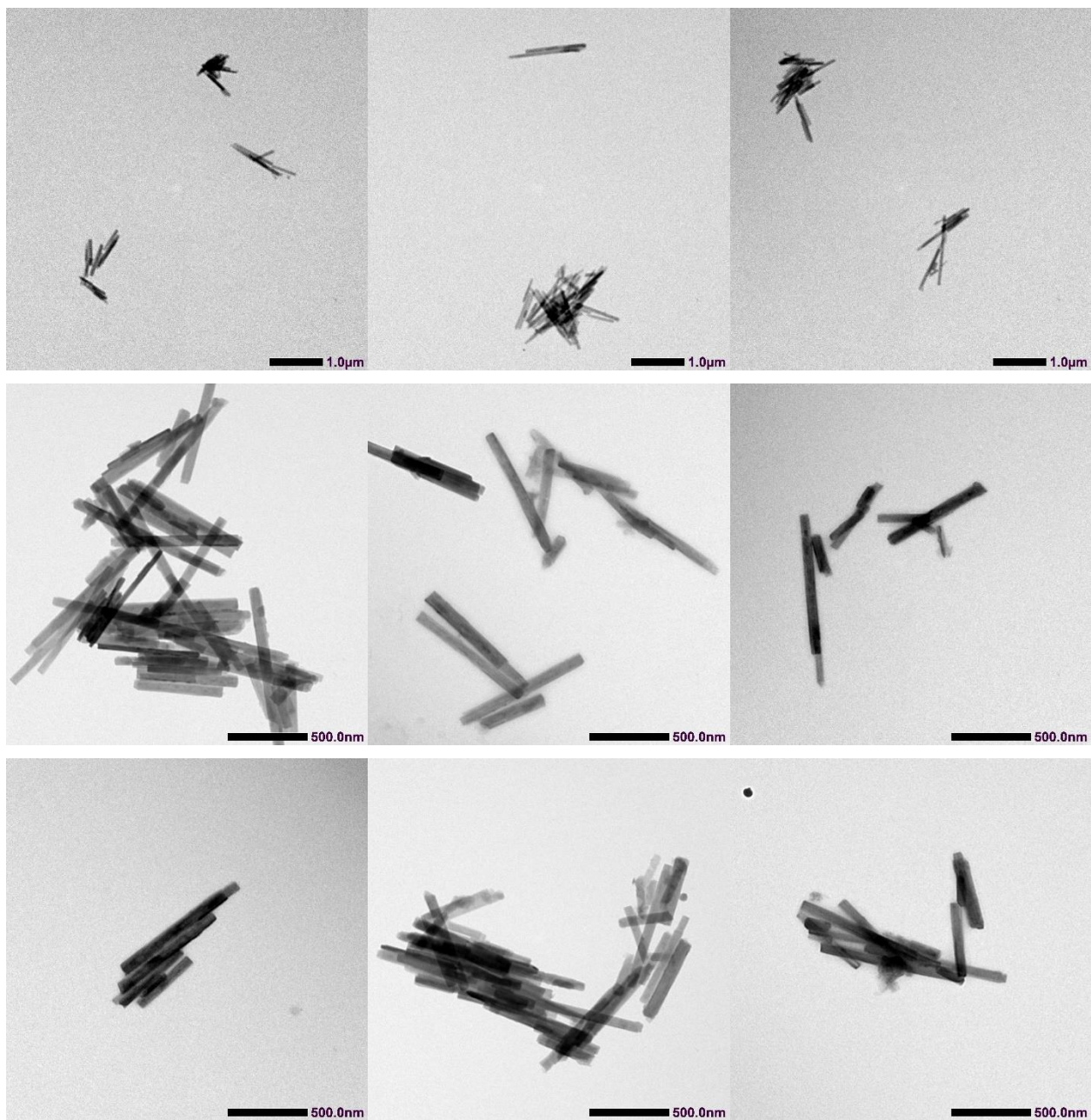
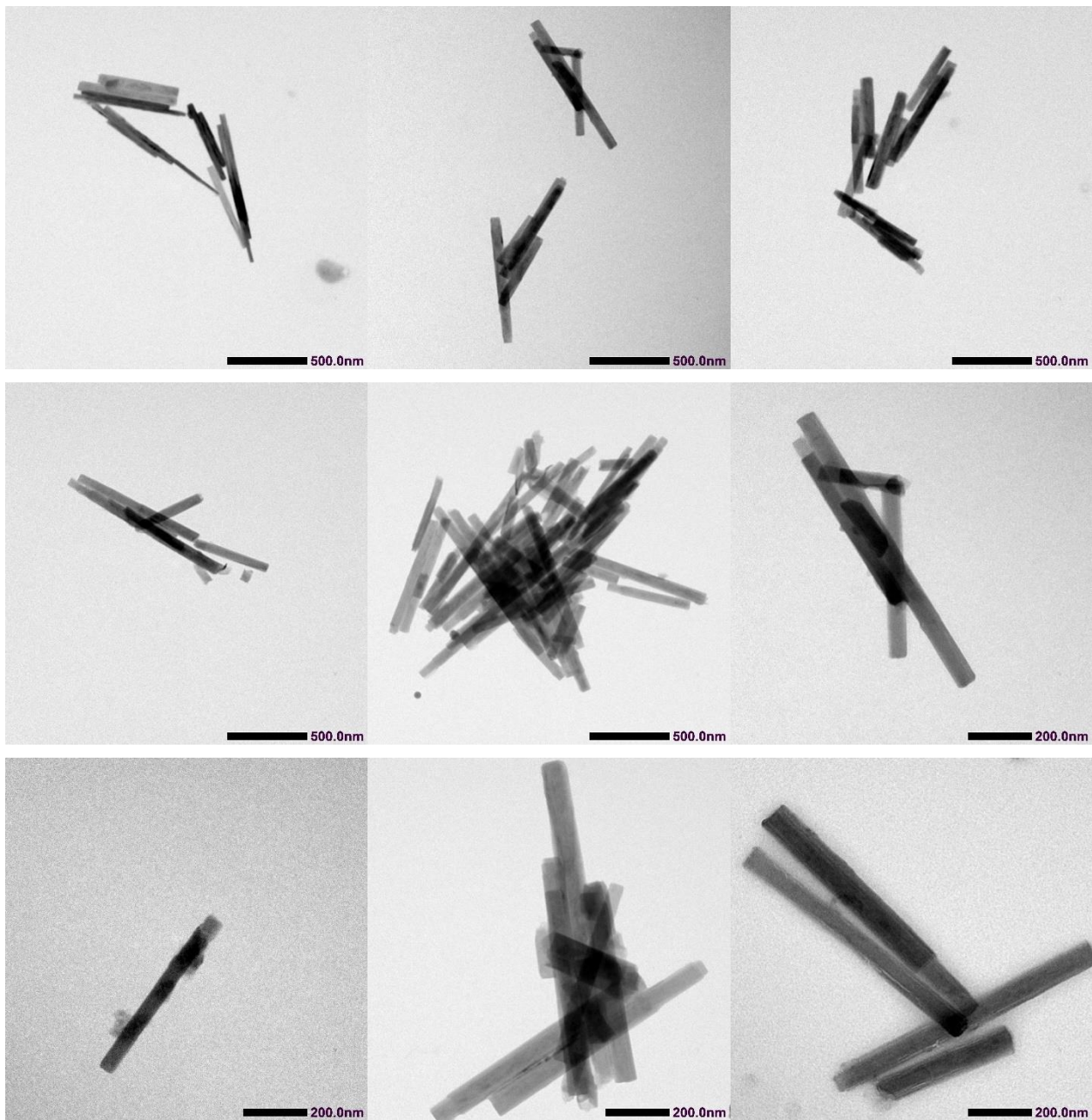

60   **Figure S4:** Camel Lake (CL) untreated

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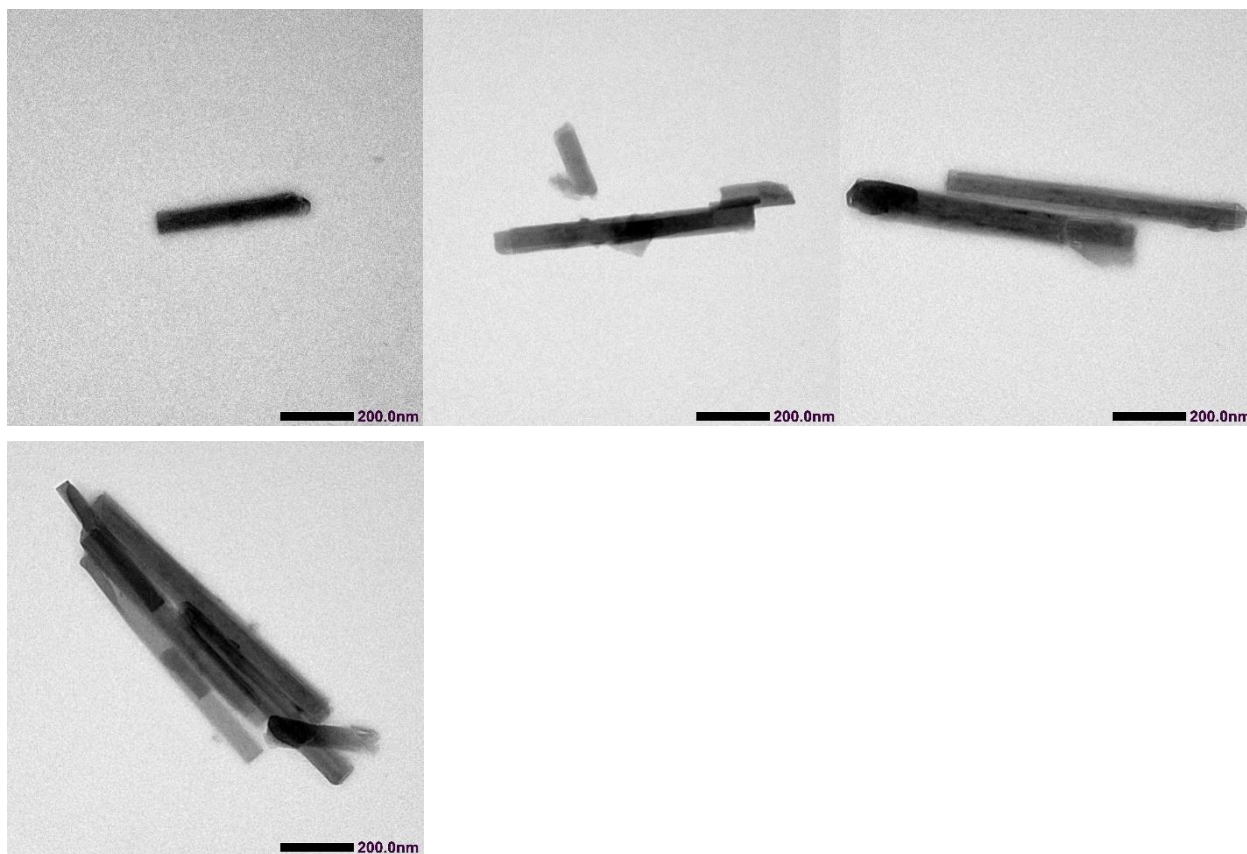
Figure S5: Camel Lake (CL) milled

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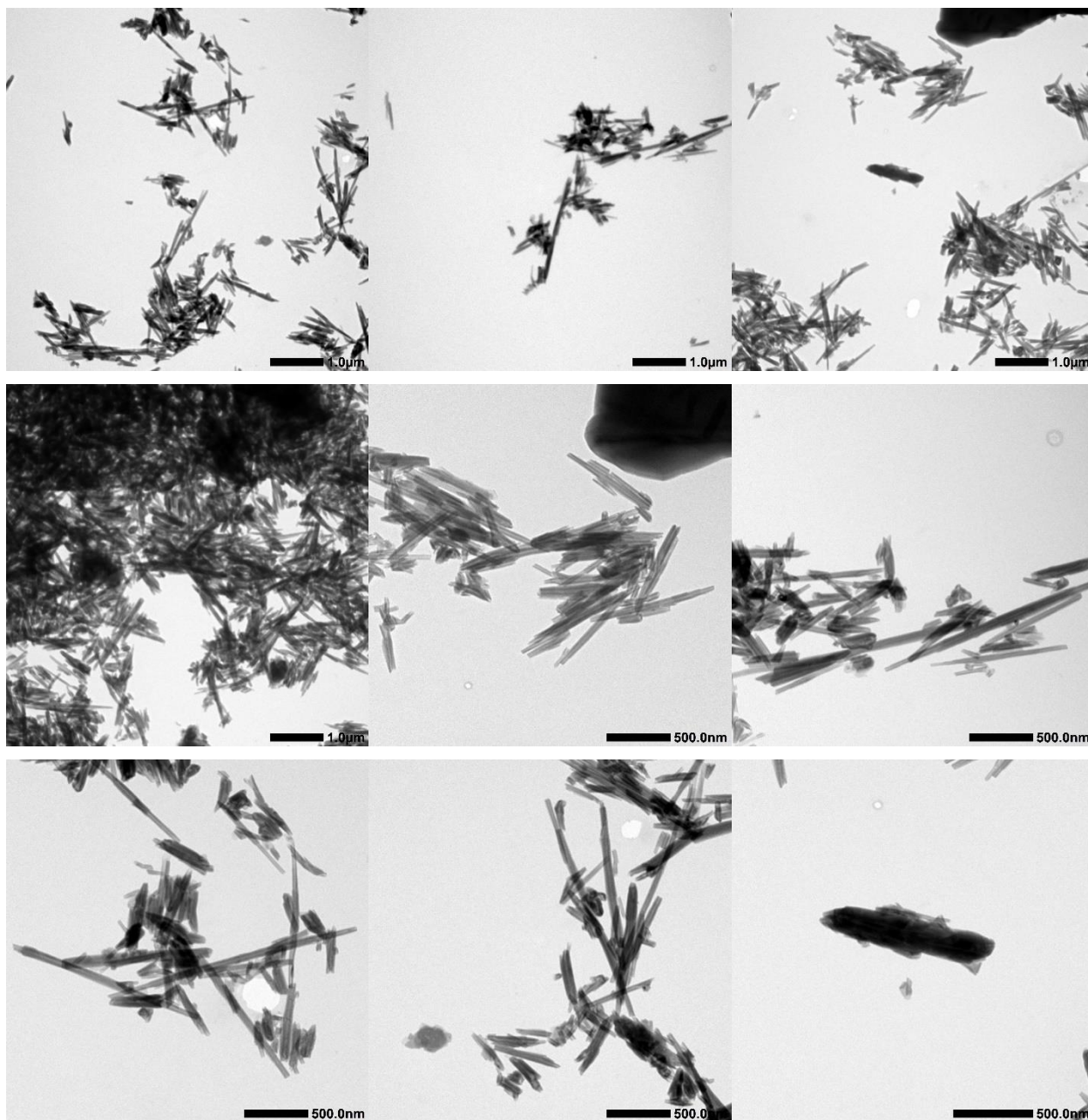
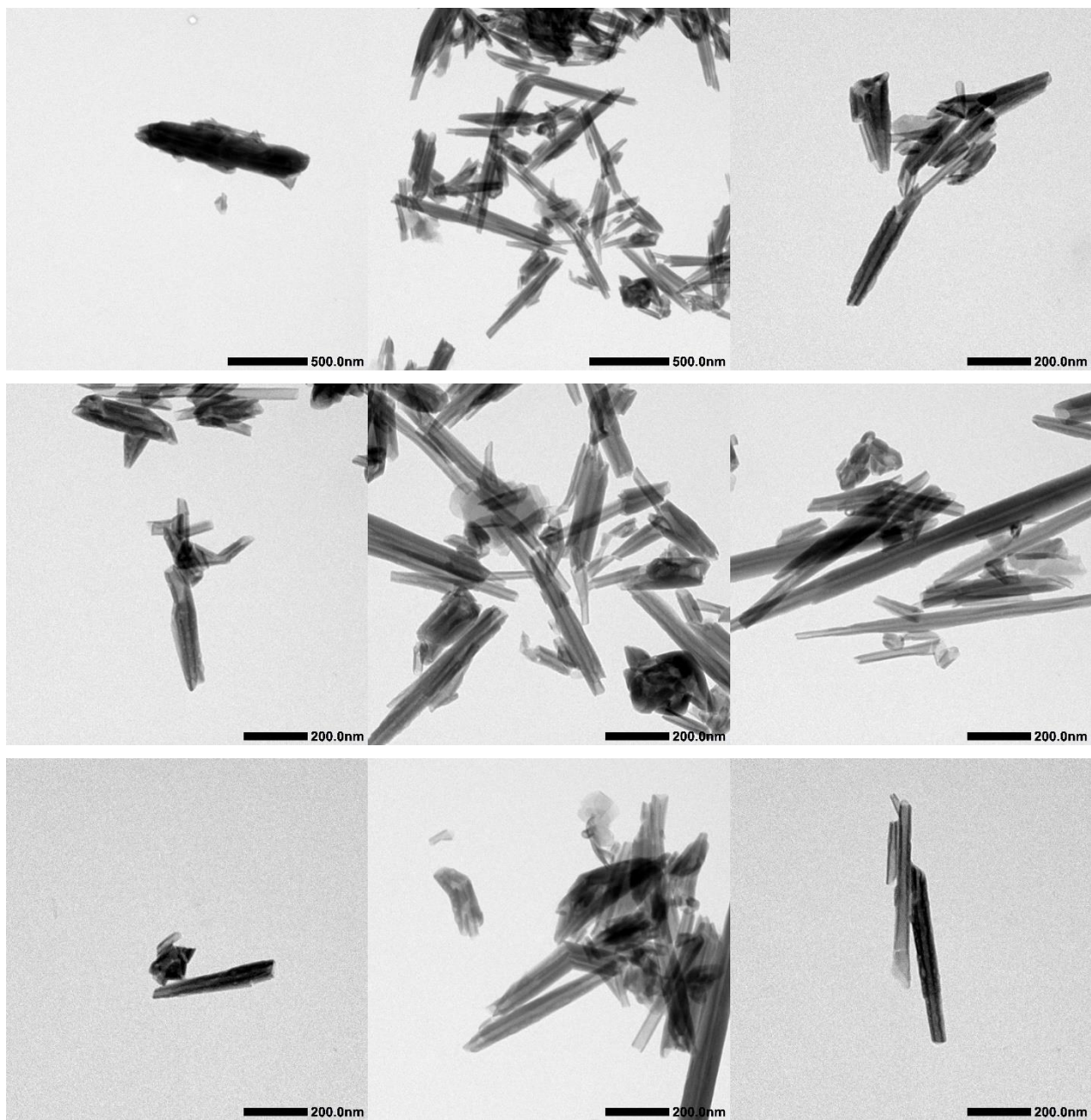
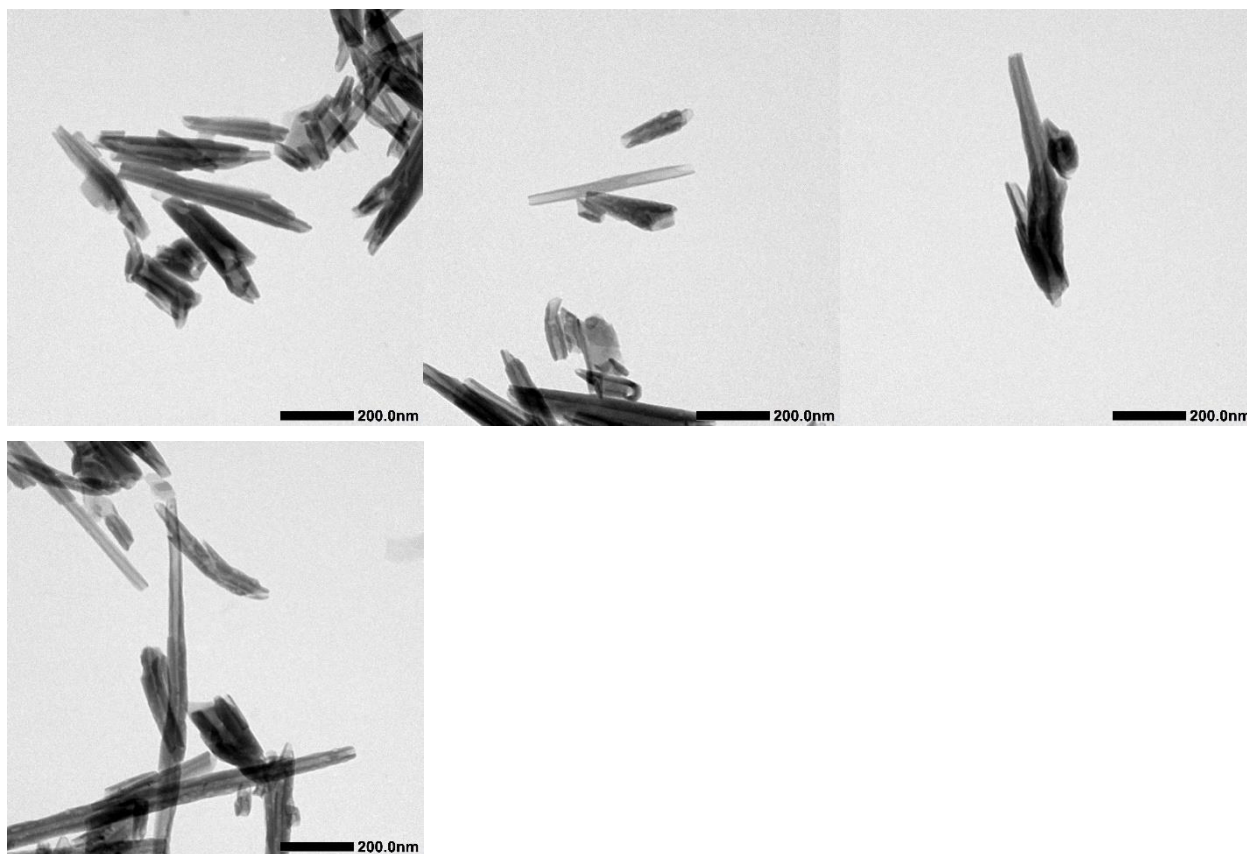
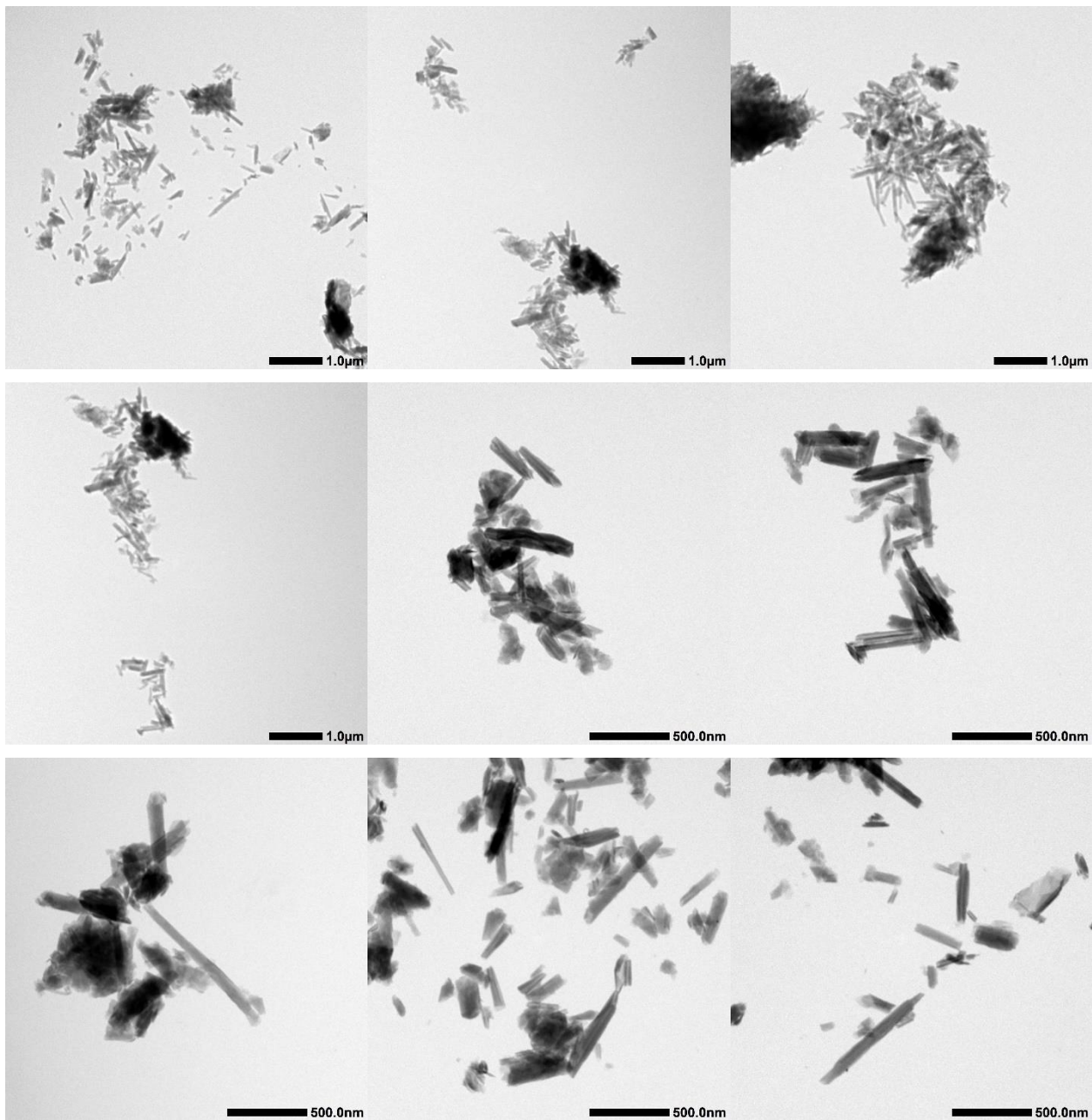


Figure S6: Jarrahdale (JA) untreated.

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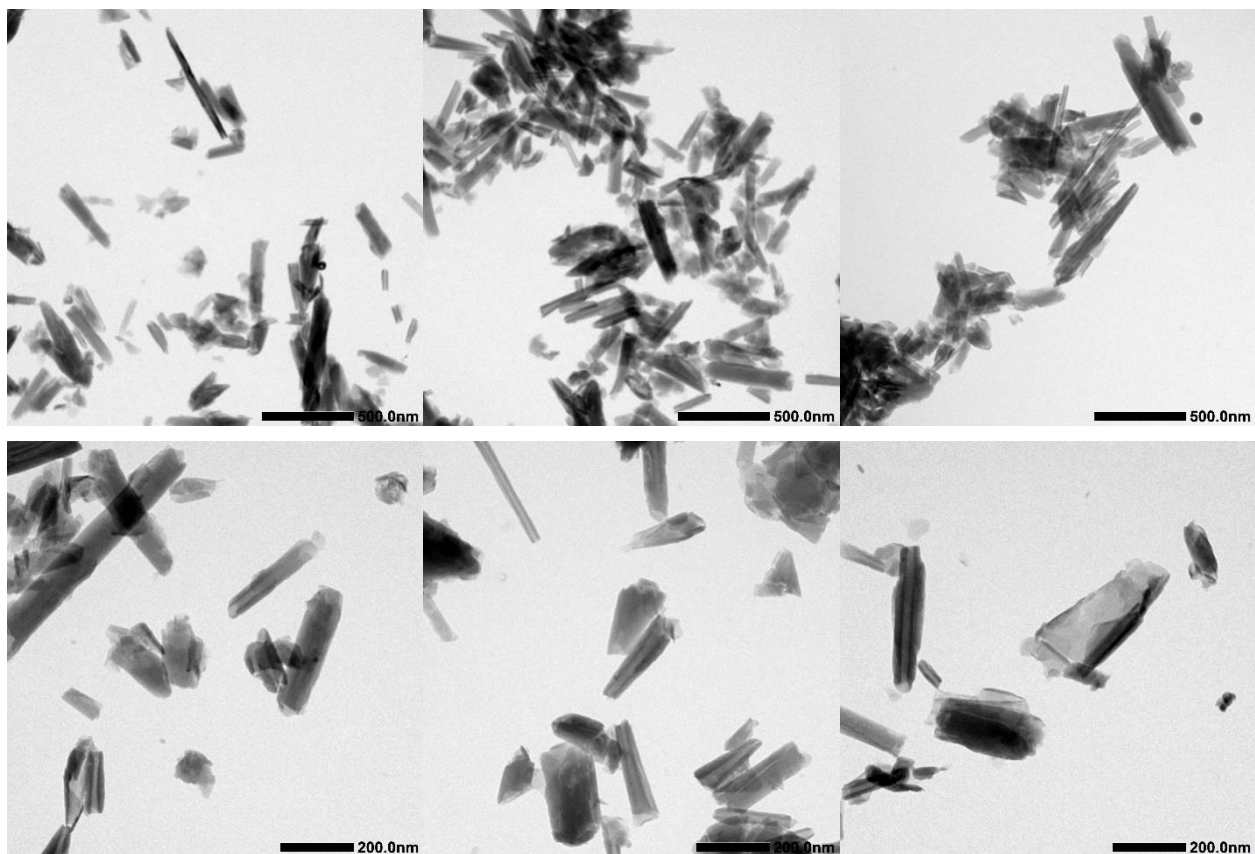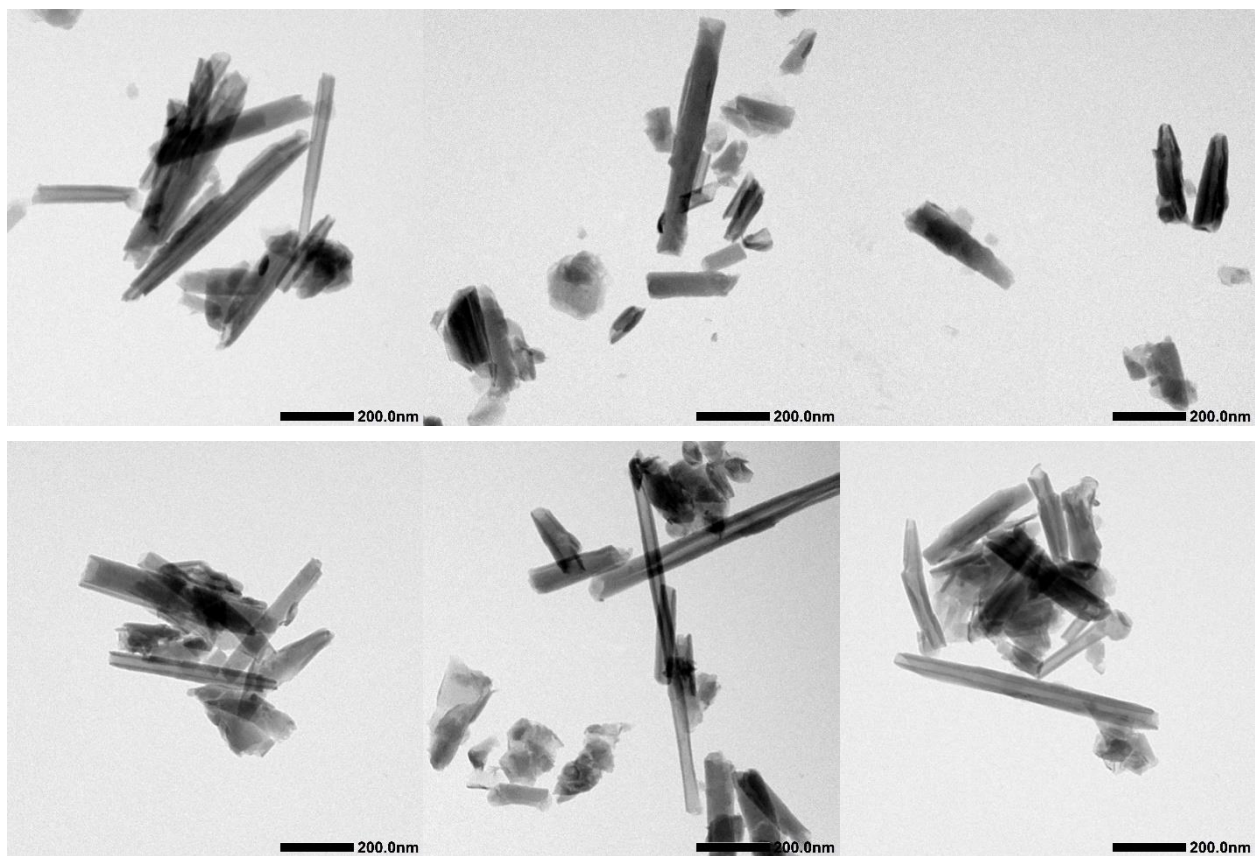
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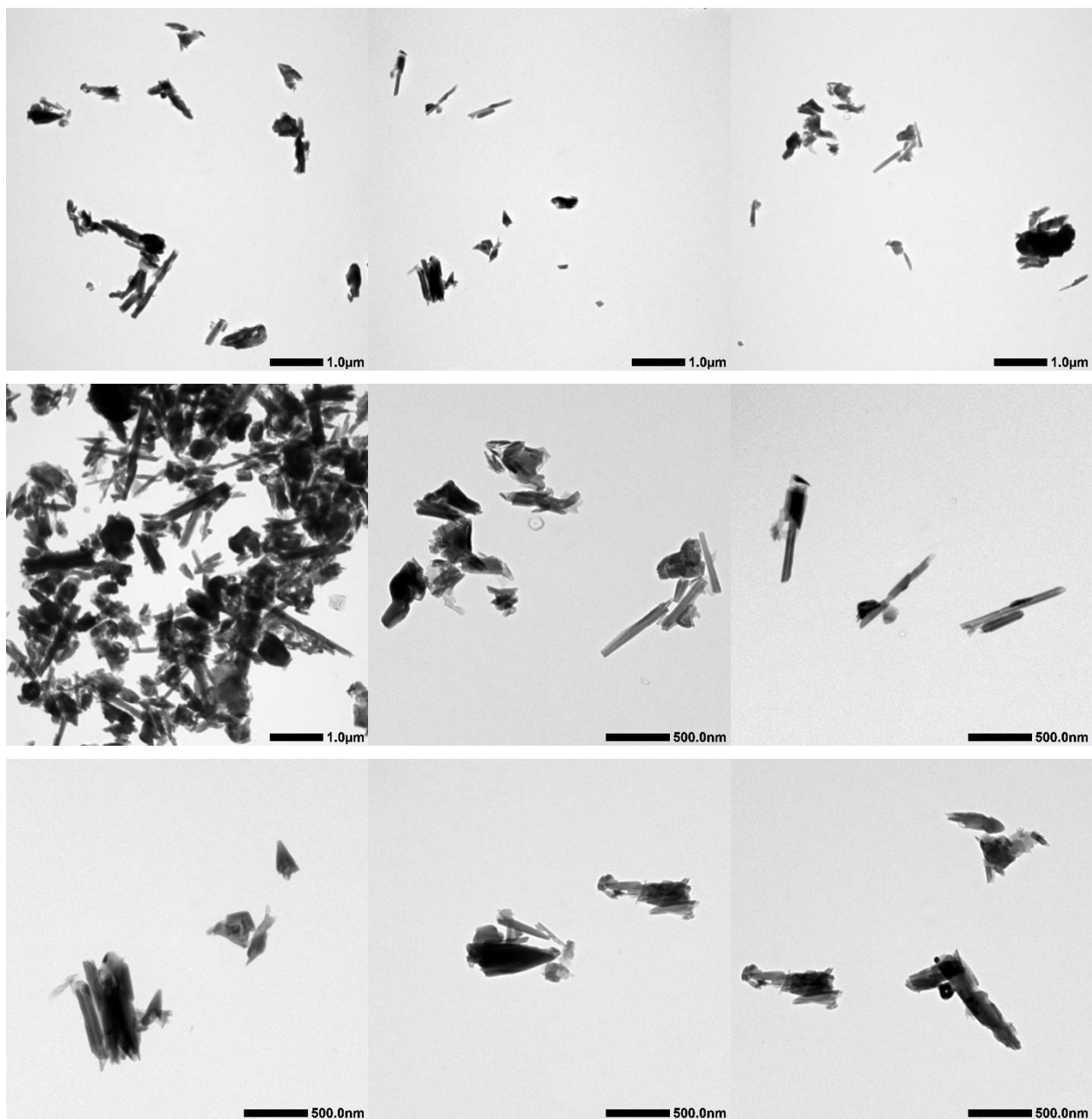
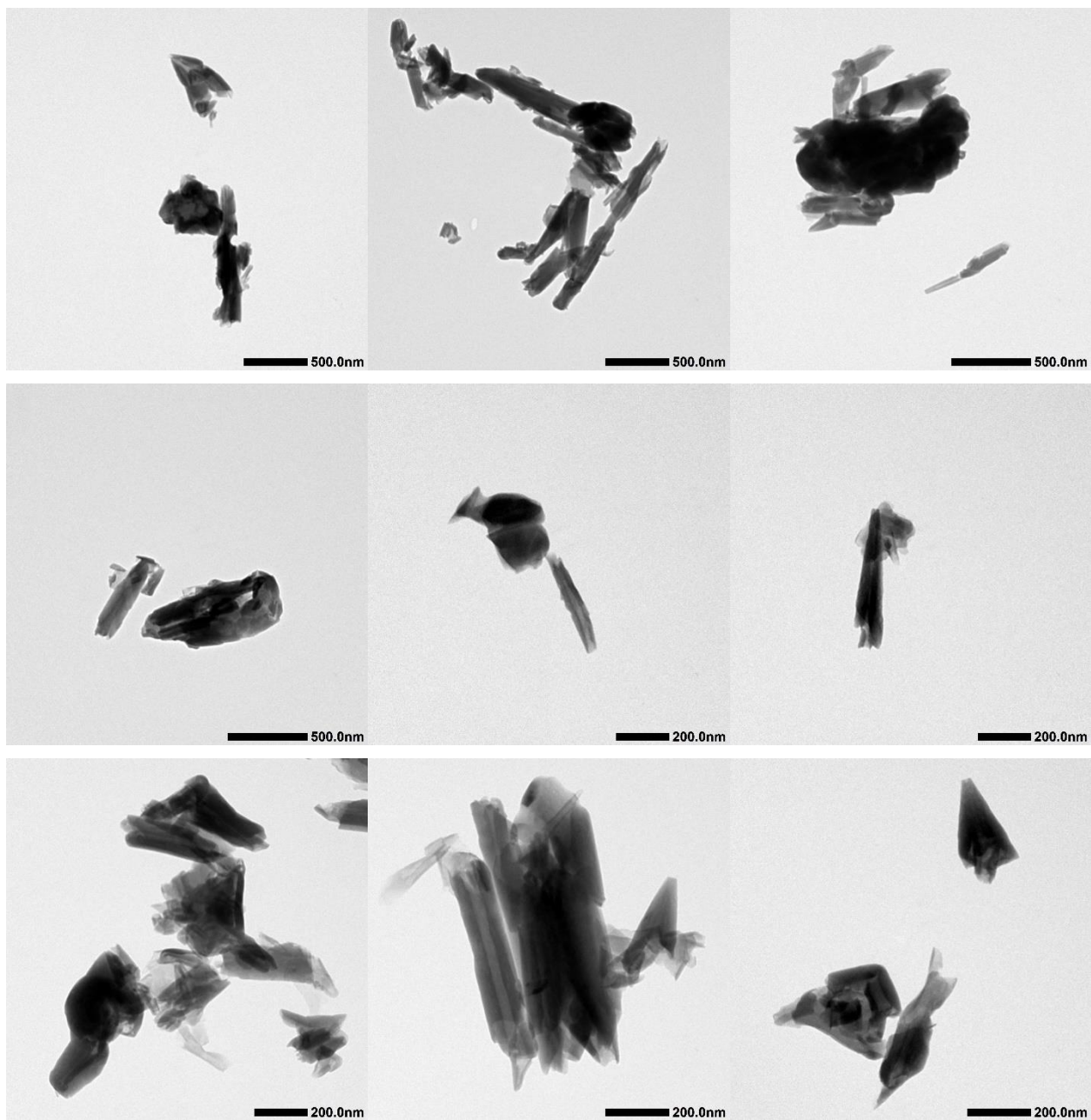
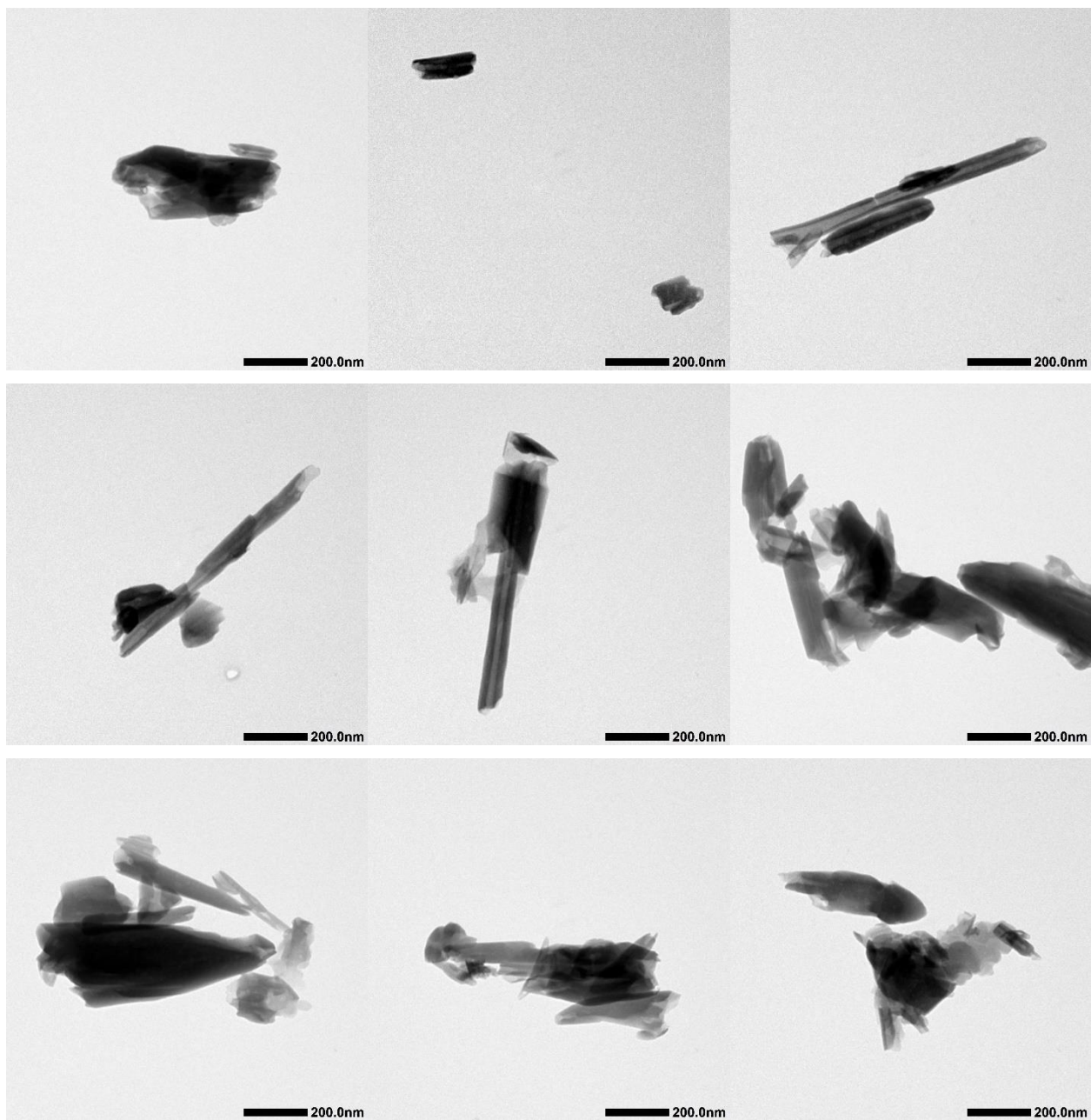
Figure S7: Jarrahdale (JA) milled.

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Figure S8: Matauri Bay (MB) untreated

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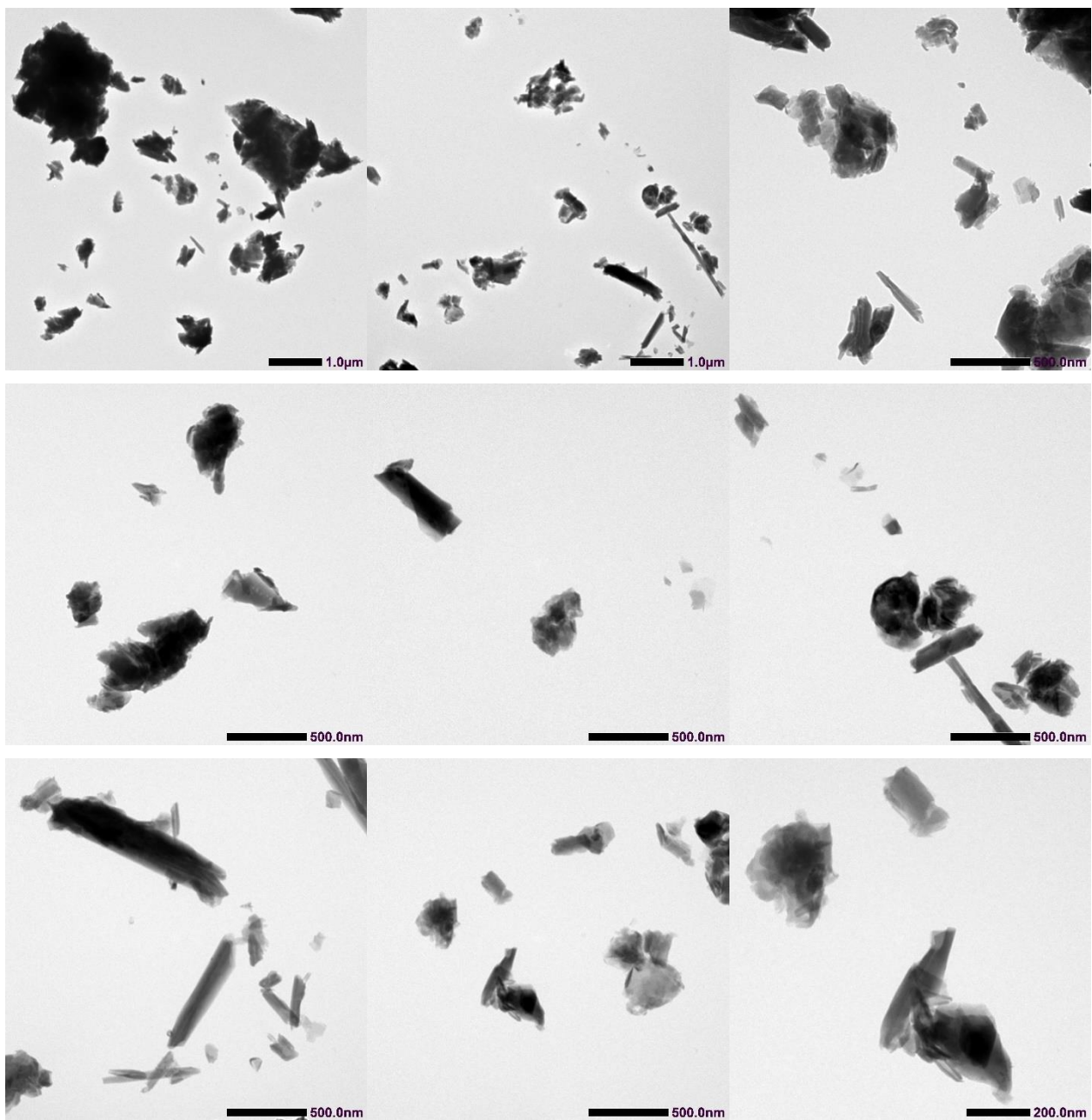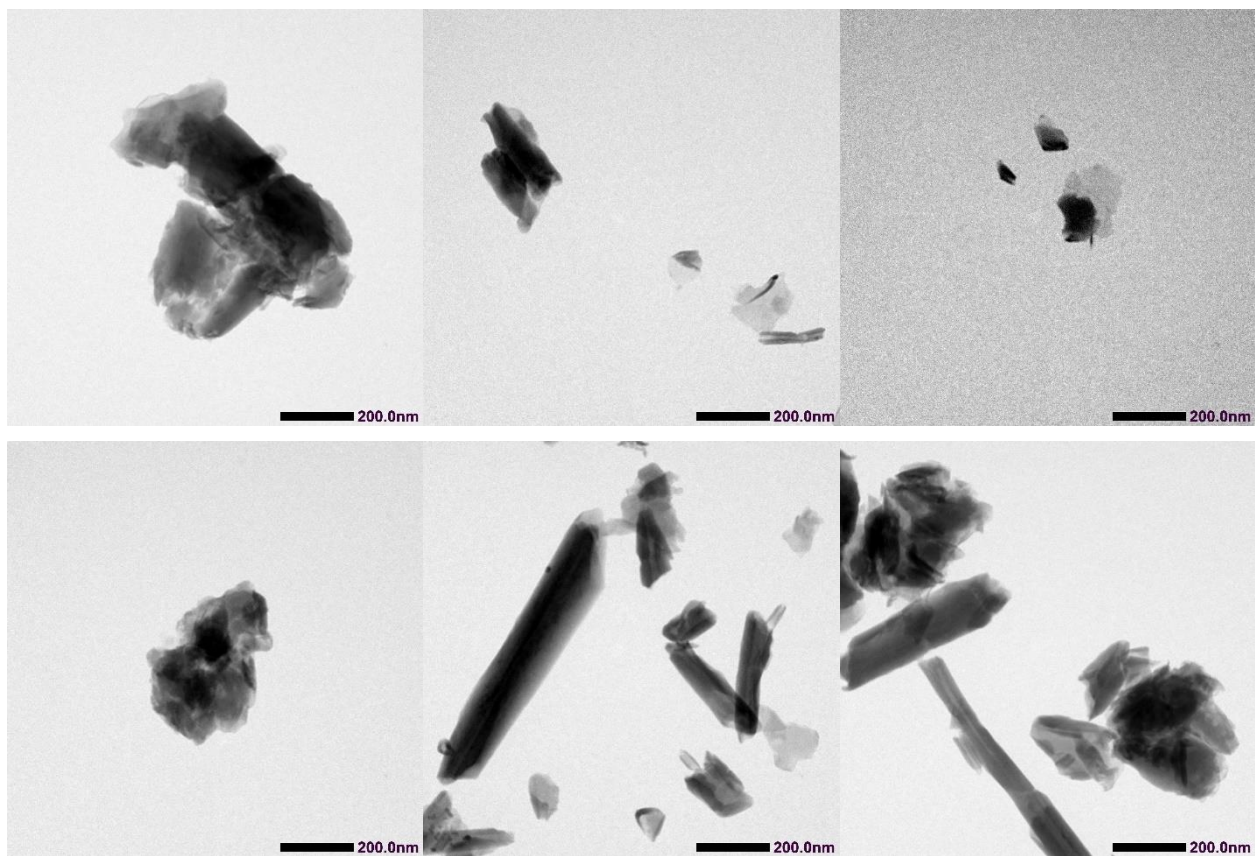
Figure S9: Matauri Bay (MB) milled.

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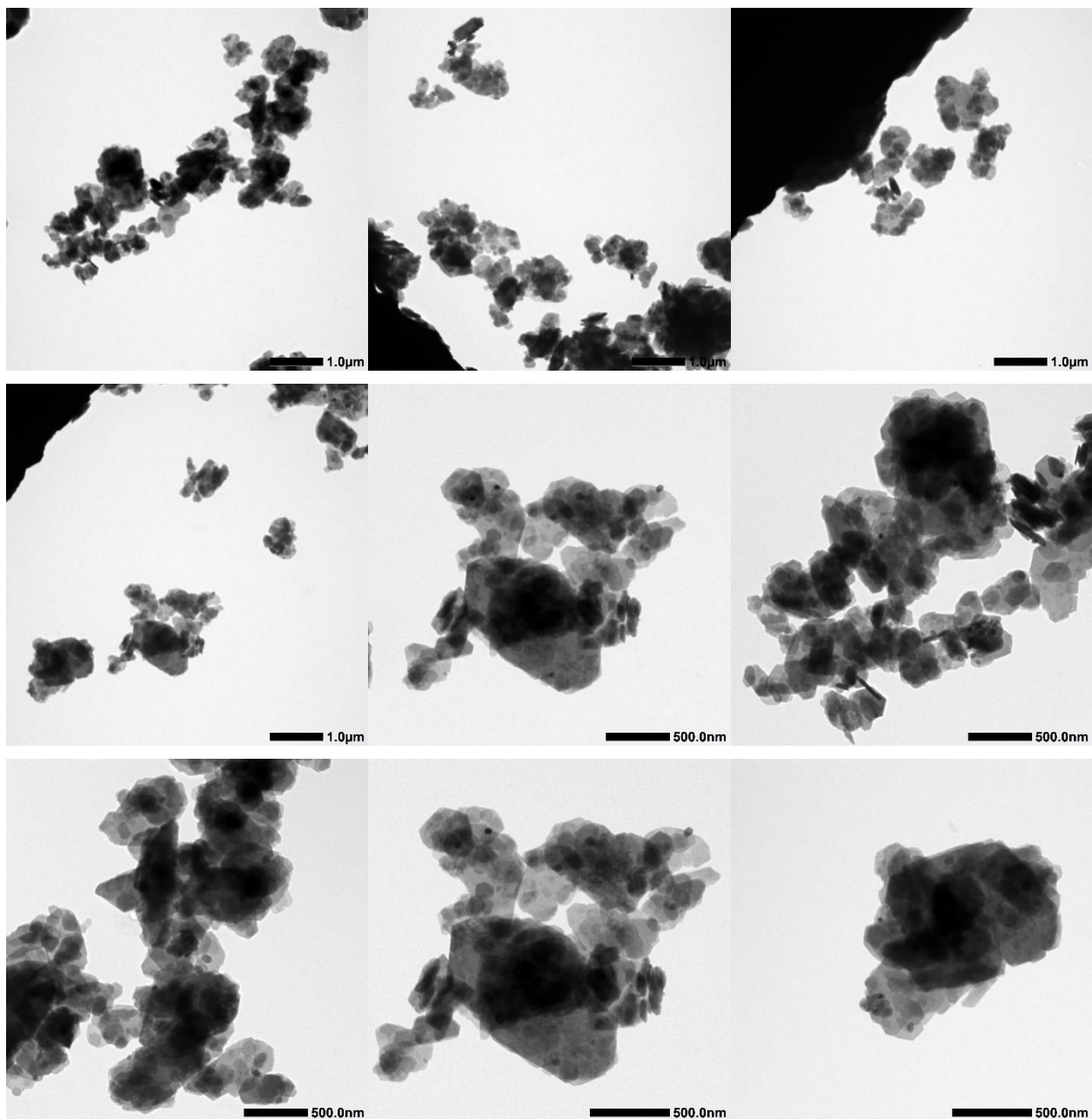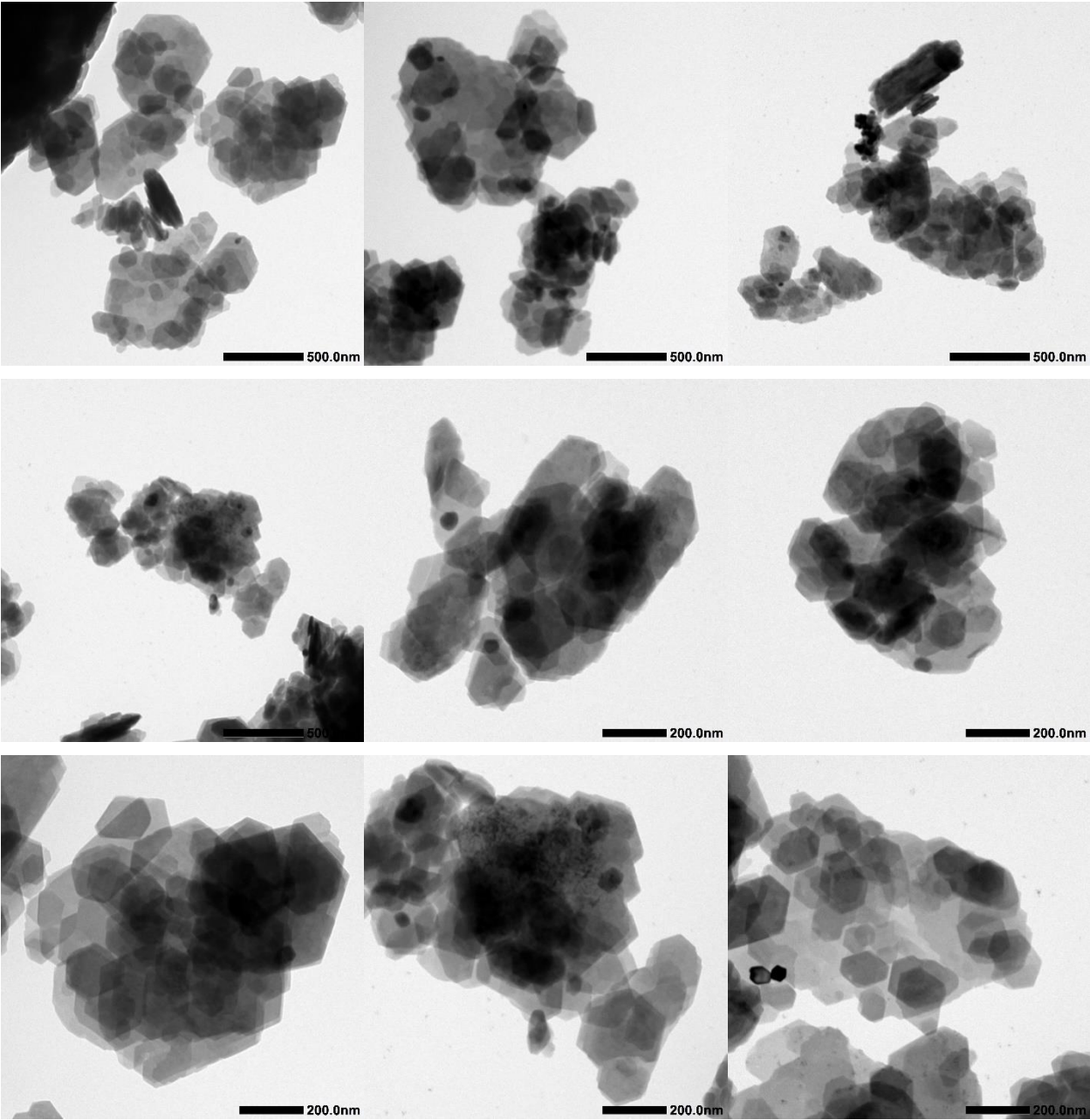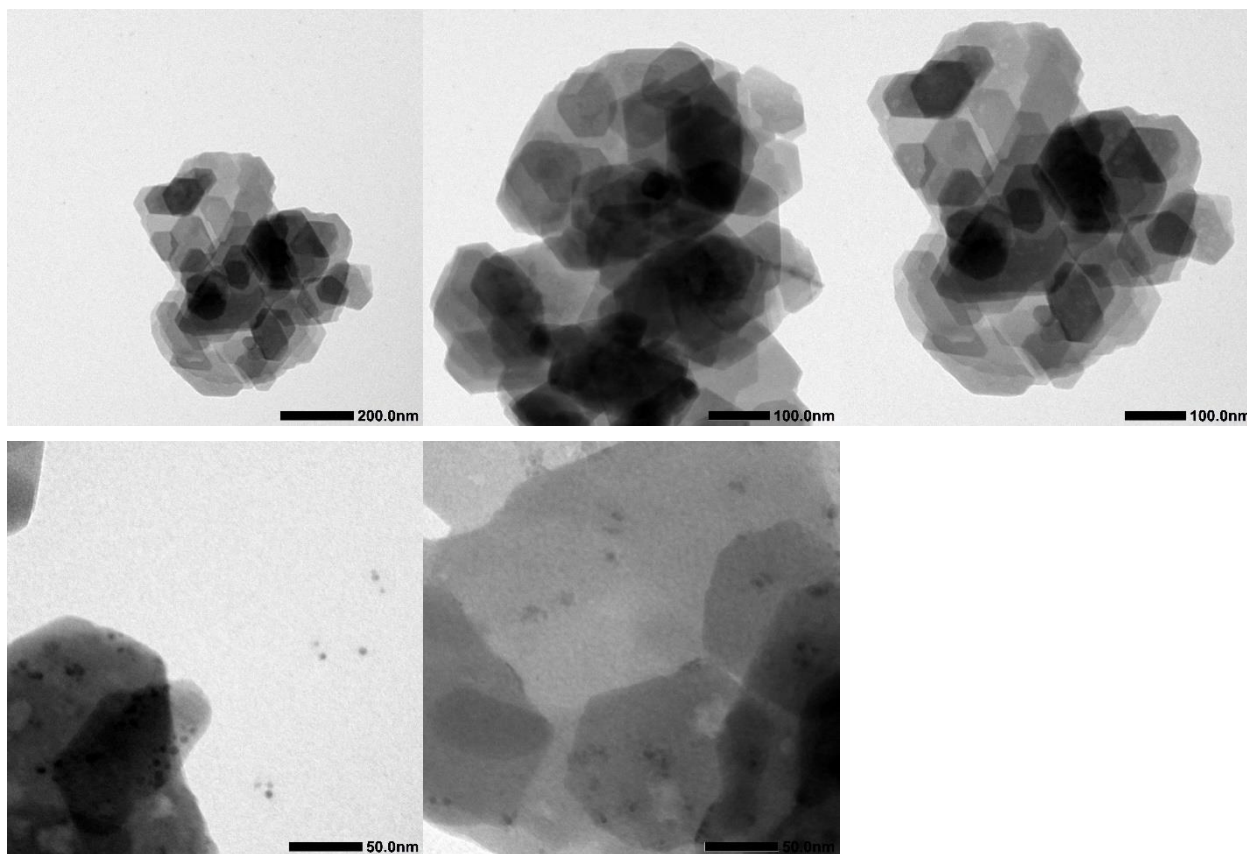
115 **Figure S10:** KGa-2 (K2) untreated.