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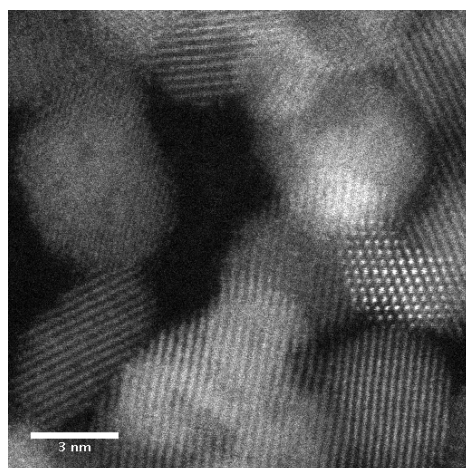
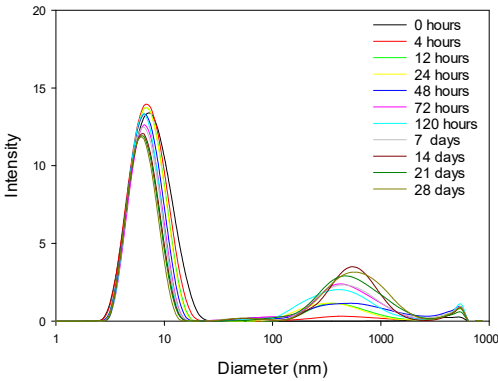
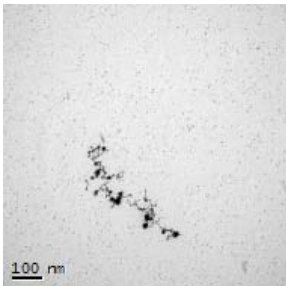
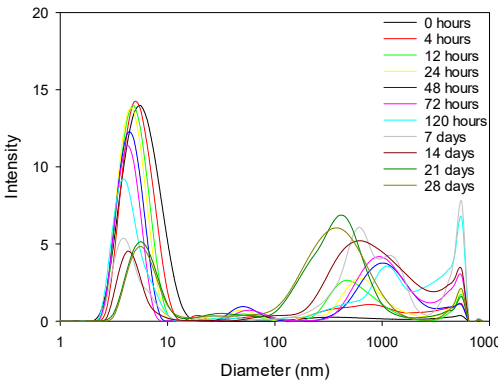
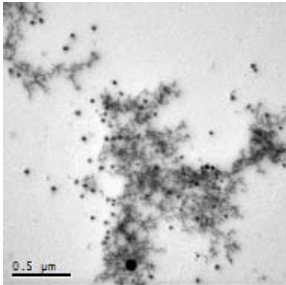
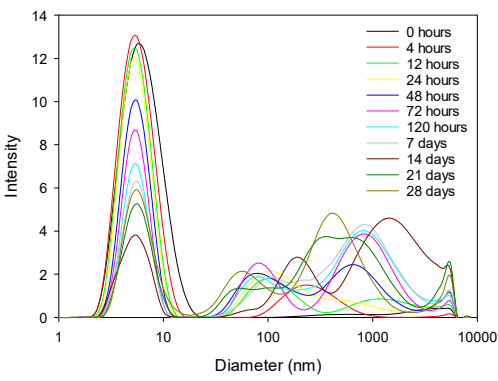
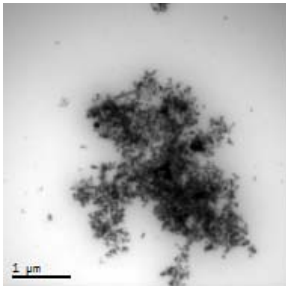


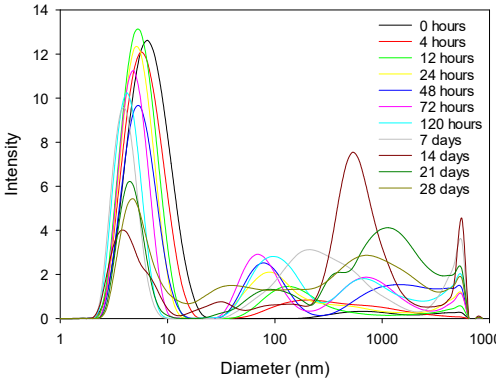
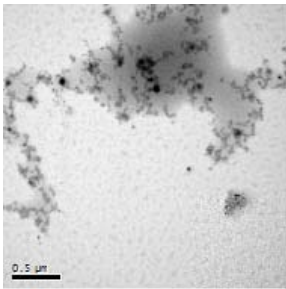
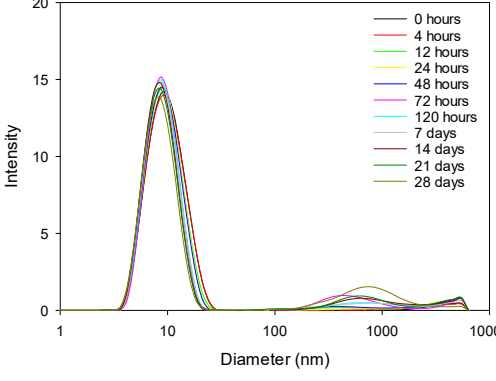
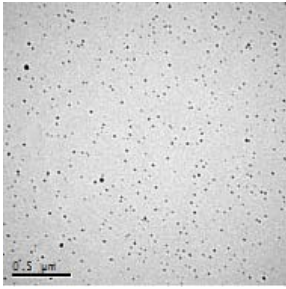
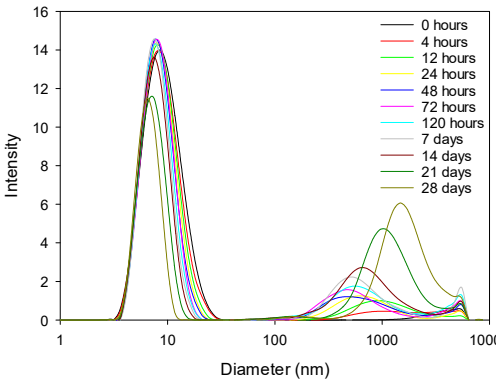
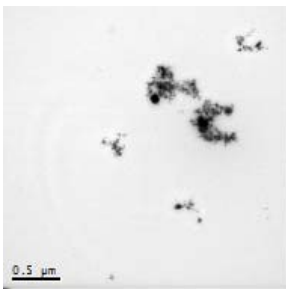
Figure S.1 STEM image of uncapped cerium dioxide NMs indicating size of 4.7 ± 1.4 nm.

Table S.1. DLS and TEM results for the 45 and 65 °C temperature exposed PVP reference and NMs samples.

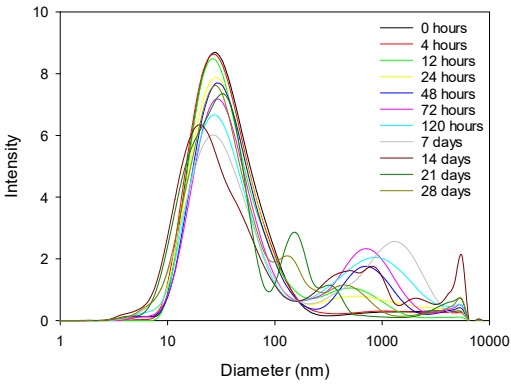
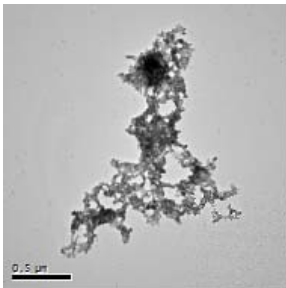
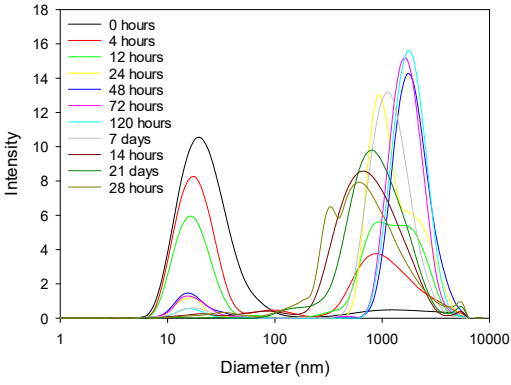
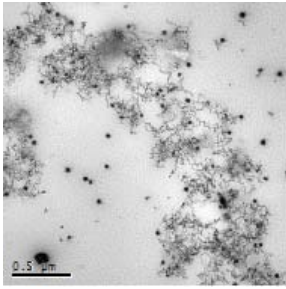
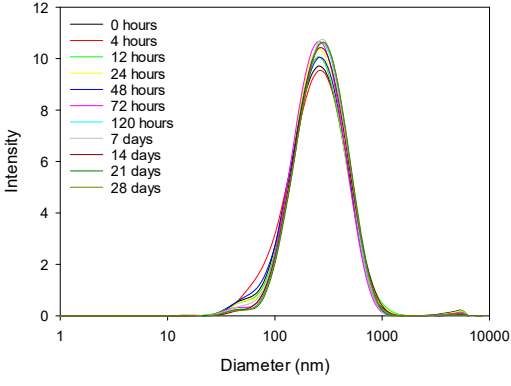
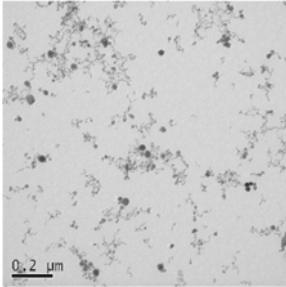
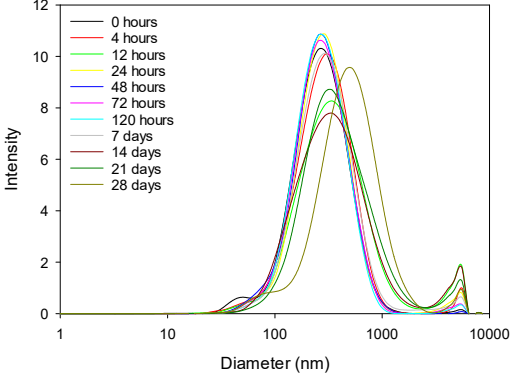
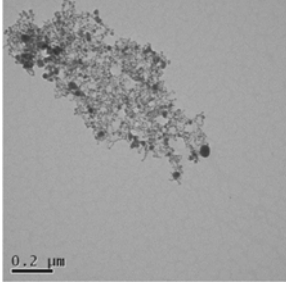
Sample	Temp (°C)	DLS Histogram	TEM image
10 K PVP reference	25	The DLS histogram for the 10 K PVP reference at 25 °C shows intensity on the y-axis (0 to 16) and diameter in nm on a logarithmic x-axis (1 to 10000). Multiple curves are plotted for exposure times: 0 hours (black), 4 hours (red), 12 hours (green), 24 hours (blue), 48 hours (magenta), 72 hours (cyan), 120 hours (brown), 7 days (grey), 14 days (olive), 21 days (dark green), and 28 days (yellow). All curves show a primary peak around 8-10 nm and a secondary, smaller peak around 1000 nm. The intensity of the primary peak decreases slightly over time.	
10 K PVP reference	45		

10 K PVP reference	65		
10 K PVP reference	80		

10 K PVP cerium dioxide	25		
10 K PVP cerium dioxide	45		
10 K PVP cerium dioxide	65		

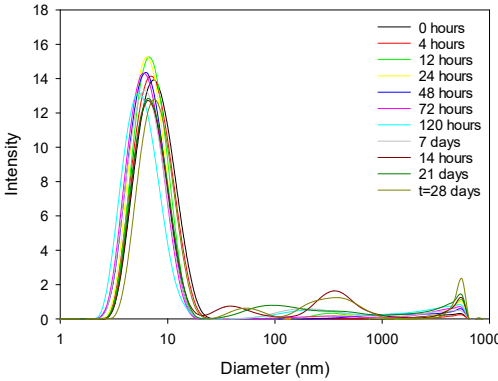
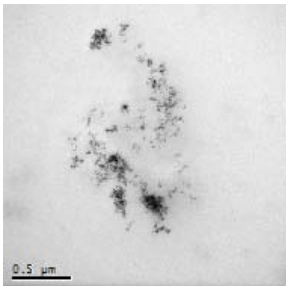
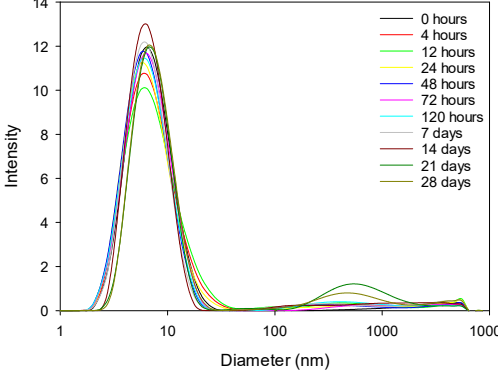
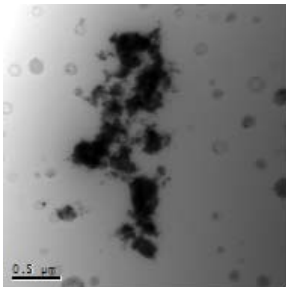
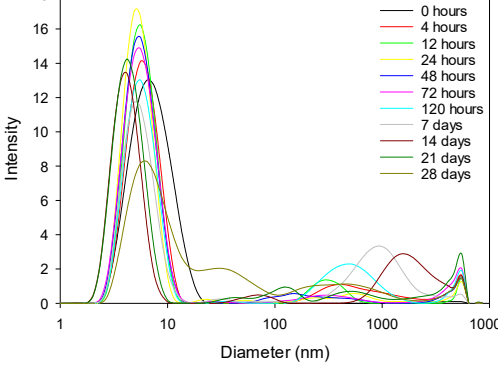
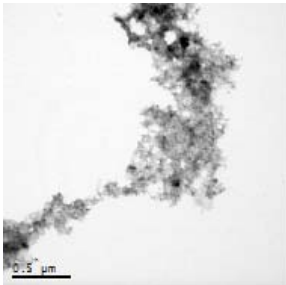
10 K PVP cerium dioxide	80		
40 K PVP cerium dioxide	25		
40 K PVP cerium dioxide	45		

40 K PVP cerium oxide	65		
40 K PVP cerium dioxide	80		
360 K PVP cerium dioxide	25		
360 K PVP cerium dioxide	45		

360 PVP cerium dioxide	K 65		
360 PVP cerium dioxide	K 80		
Uncapped cerium dioxide	25		
Uncapped cerium dioxide	45		

Uncapped cerium dioxide	65		
Uncapped cerium dioxide	80		
10 K PVP capped copper oxide	25		

10 K PVP capped copper oxide	45		
10 K PVP capped copper oxide	65		
10 K PVP capped copper oxide	80		
10 K PVP capped zinc oxide	25		

10 K PVP capped zinc oxide	45		
10 K PVP capped zinc oxide	65		
10 K PVP capped zinc oxide	80		

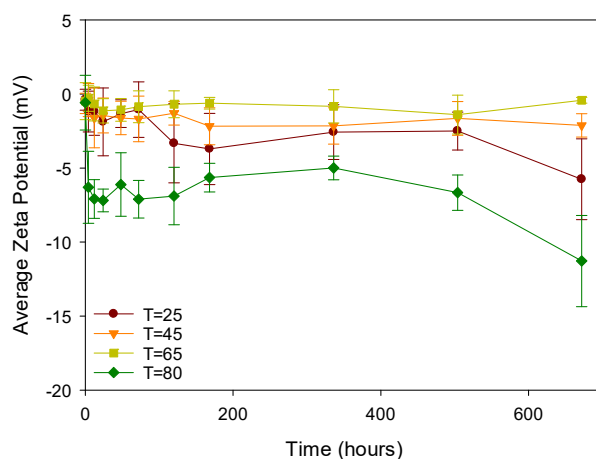


Figure S.2 Average Zeta potential (mV) as a function of time for PVP reference sample at 25, 45, 65 and 80 °C.

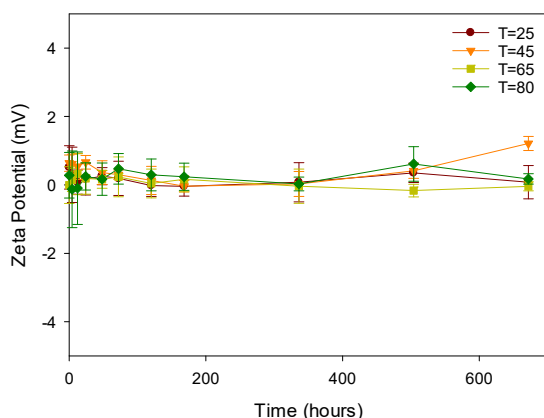


Figure S.3 Average Zeta potential (mV) as a function of time for 10 K PVP capped cerium dioxide NMs at 25, 45, 65 and 80 °C.

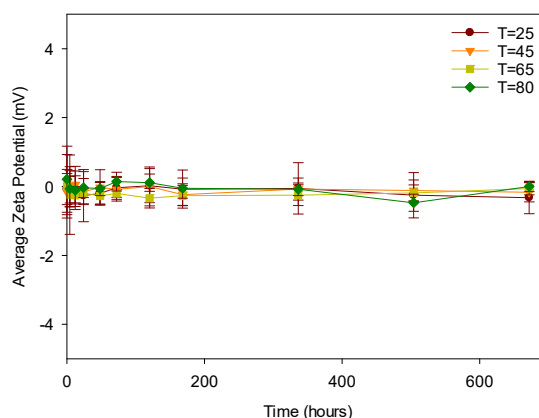


Figure S.4 Average Zeta potential (mV) as a function of time for 40 K PVP capped cerium dioxide NMs at 25, 45, 65 and 80 °C.

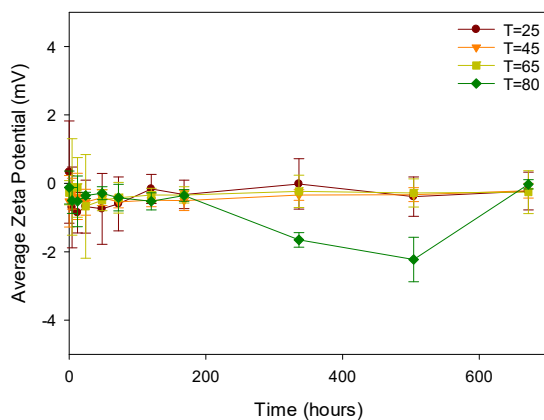


Figure S.5 Average Zeta potential (mV) as a function of time for 360 K PVP capped cerium dioxide NMs at 25, 45, 65 and 80 °C.

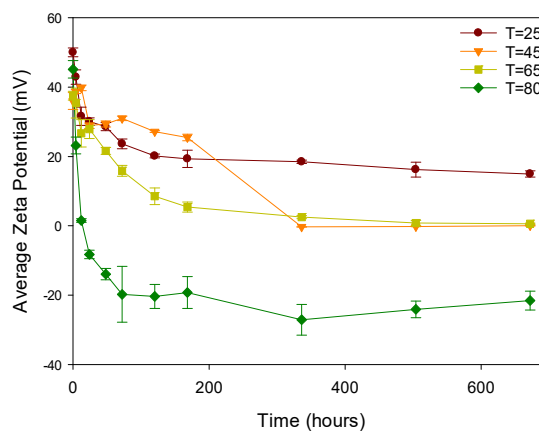


Figure S.6 Average Zeta potential (mV) as a function of time for uncapped cerium dioxide NMs at 25, 45, 65 and 80 °C.

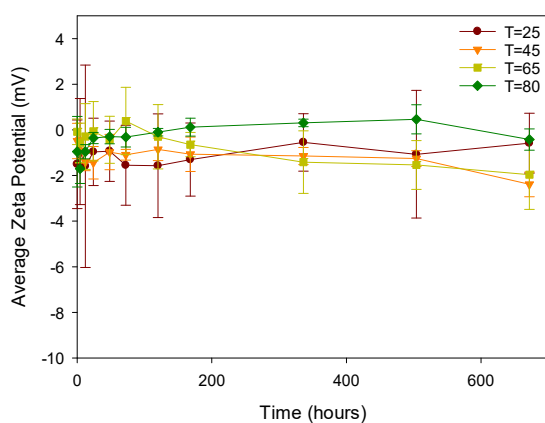


Figure S.7 Average Zeta potential (mV) as a function of time for 10 K PVP capped zinc oxide NMs at 25, 45, 65 and 80 °C.

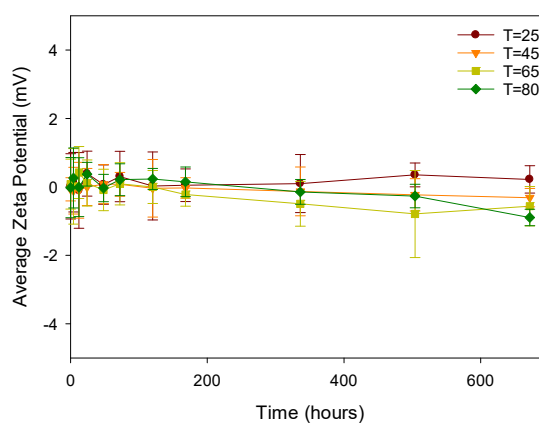


Figure S.8 Average Zeta potential (mV) as a function of time for 10 K PVP capped copper oxide NMs at 25, 45, 65 and 80 °C.

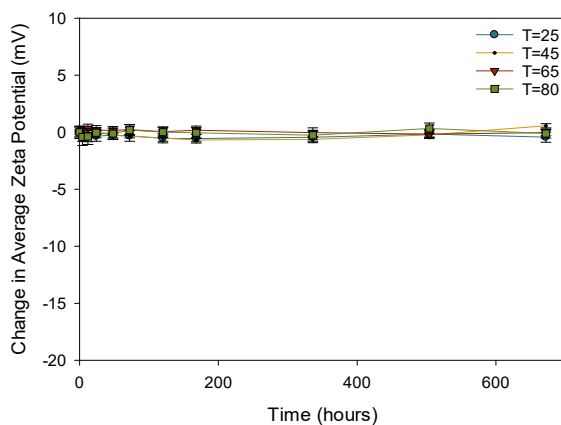


Figure S.9 Change in average zeta potential (mV) as a function of time for 10 K PVP capped cerium dioxide NMs at 25, 45, 65 and 80 °C.

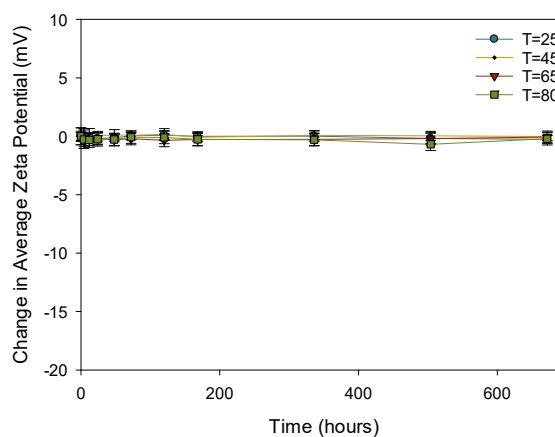


Figure S.10 Change in average zeta potential (mV) as a function of time for 40 K PVP capped cerium dioxide NMs at 25, 45, 65 and 80 °C.

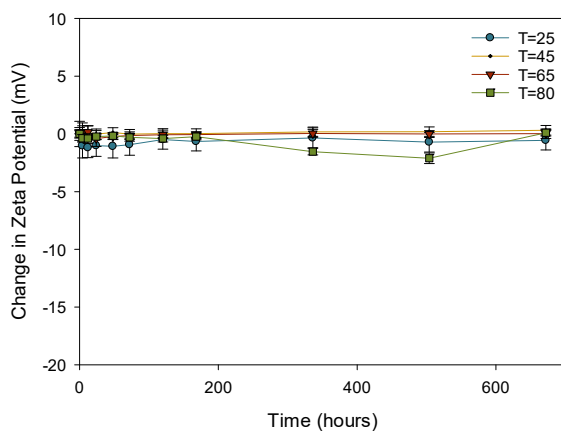


Figure S.11 Change in average zeta potential (mV) as a function of time for 360 K PVP capped cerium dioxide NMs at 25, 45, 65 and 80 °C.

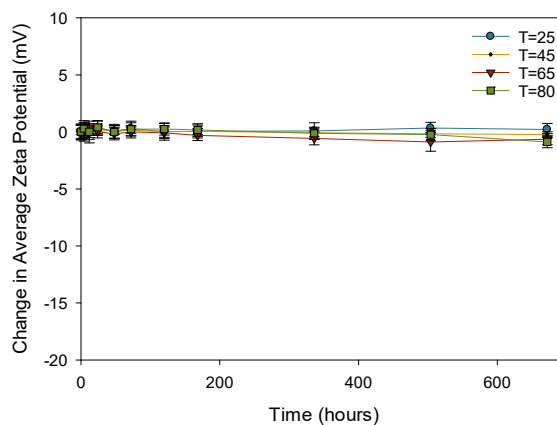


Figure S.12 Change in average zeta potential (mV) as a function of time for 10 K PVP capped copper oxide NMs at 25, 45, 65 and 80 °C.

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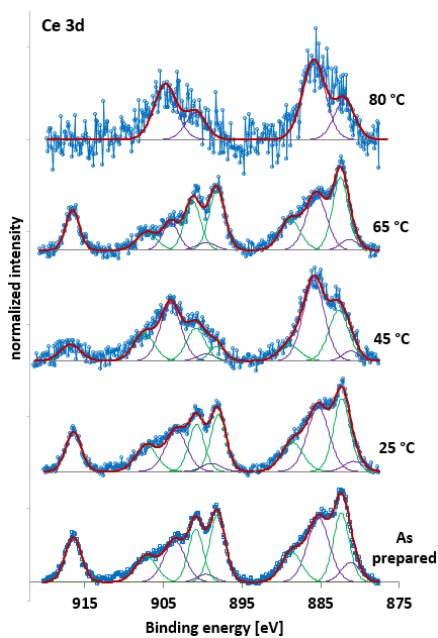


Figure S.13. XPS Spectra for 10 K PVP capped ceria NMs as prepared and after 28 days at T=25, 45, 65 and 80 °C indicating Ce^{3+} (violet) and Ce^{4+} (green) components.

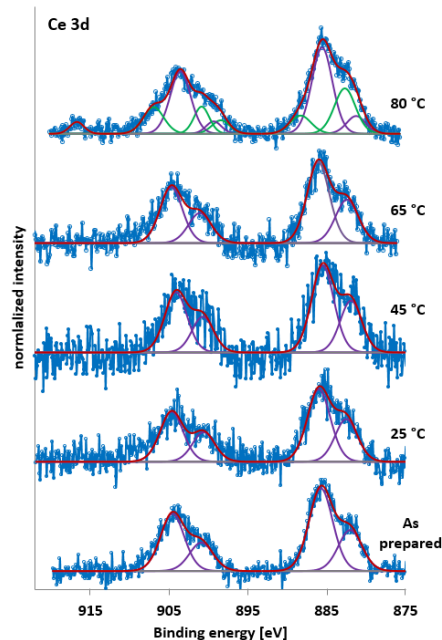


Figure S.14. XPS Spectra for 40 K PVP capped ceria NMs as prepared and after 28 days at T=25, 45, 65 and 80 °C indicating Ce^{3+} (violet) and Ce^{4+} (green) components.

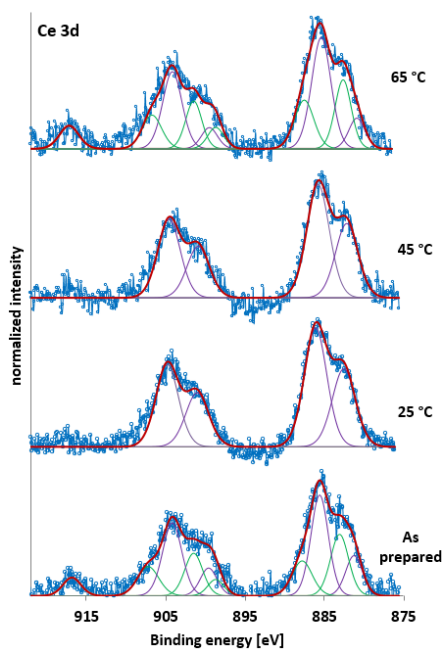


Figure S.15. XPS Spectra for 360 K PVP capped ceria NMs as prepared and after 28 days at T=25, 45, 65 and 80 °C indicating Ce³⁺ (violet) and Ce⁴⁺ (green) components.

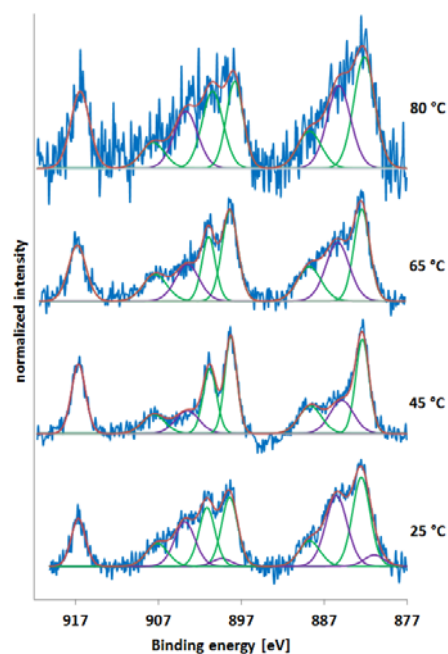


Figure S.16 XPS Spectra for uncapped cerium dioxide NMs as prepared and after 28 days at T=25, 45, 65 and 80 °C indicating Ce³⁺ (violet) and Ce⁴⁺ (green) components.

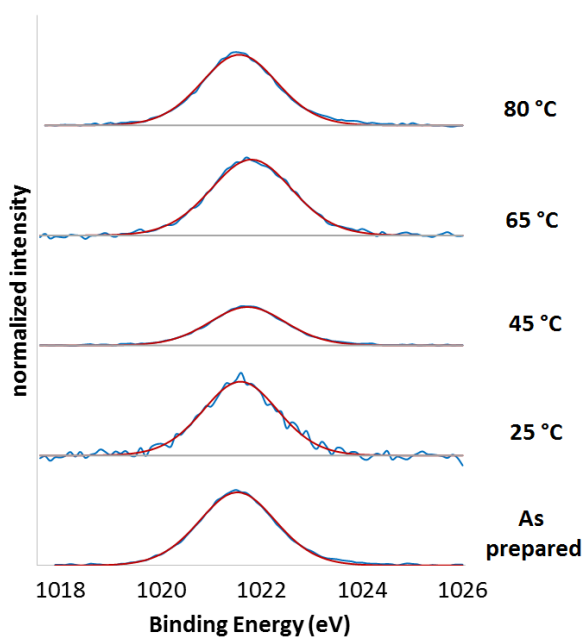


Figure S.17 XPS Spectra for 10 K PVP capped zinc oxide NMs as prepared and after 28 days at T=25, 45, 65 and 80 °C.

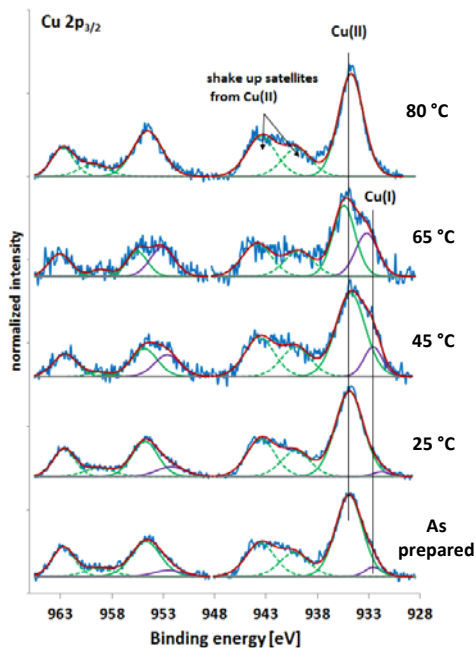


Figure S.18. XPS Spectra for 10 K PVP capped copper oxide NMs as prepared and after 28 days at T=25, 45, 65 and 80 °C indicating Cu⁺ (violet) and Cu²⁺ (green) components.

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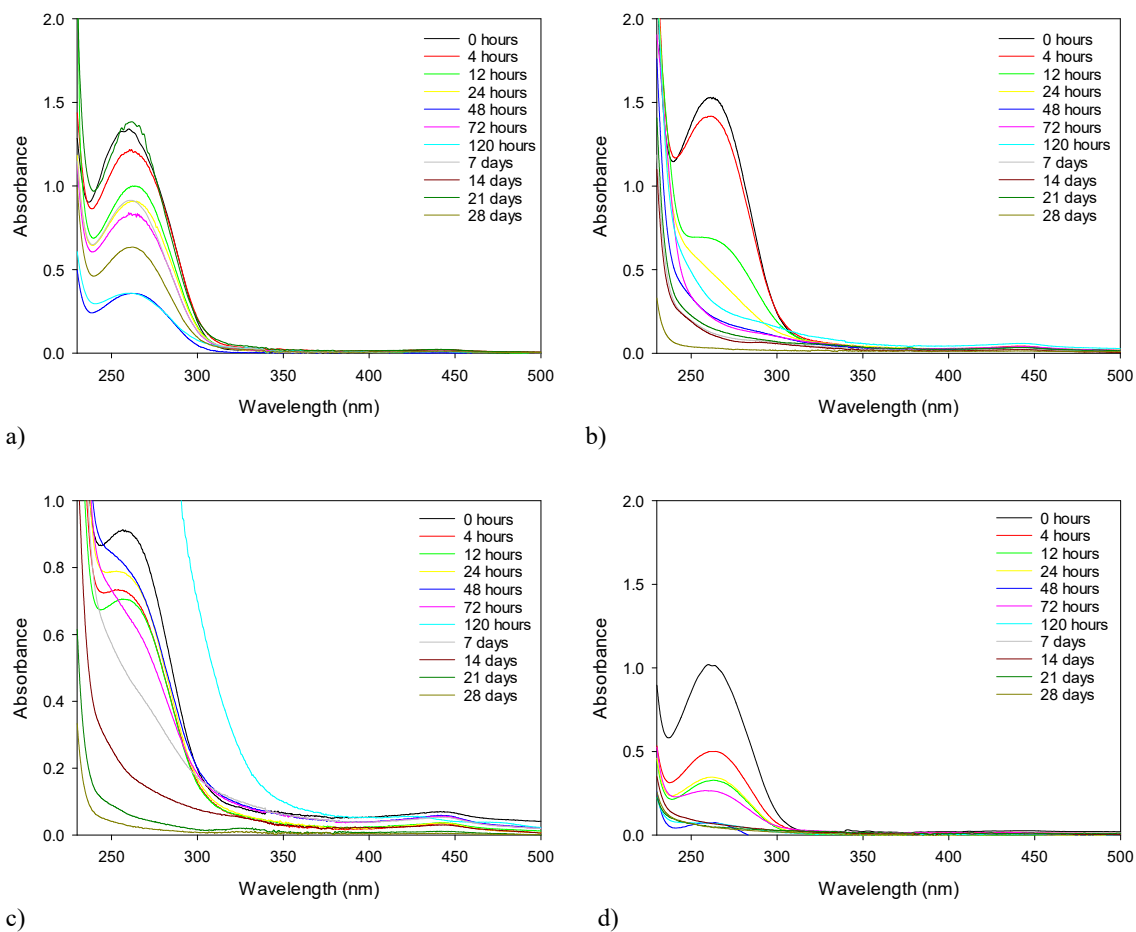
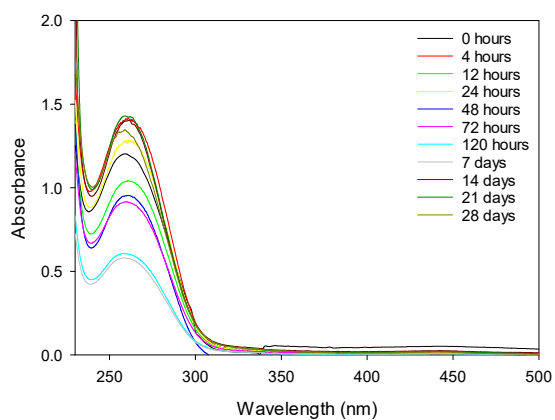
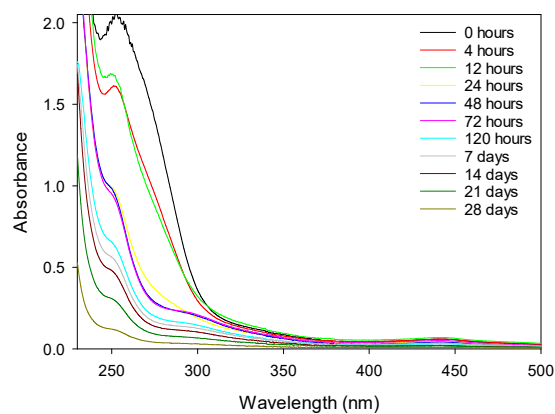


Figure S.19 UV-VIS spectra for 10 K PVP reference NMs exposed to a) 25, b) 45, c) 65 and d) 80 °C as a function of time.

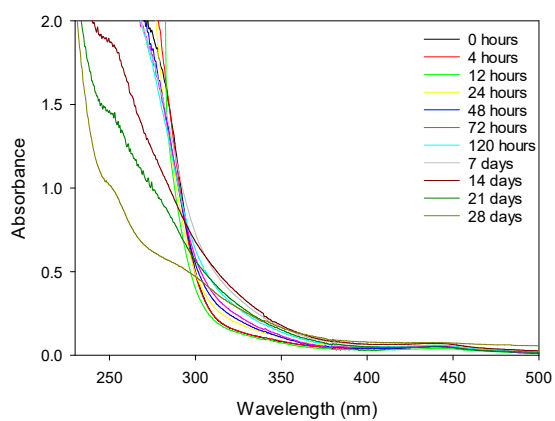
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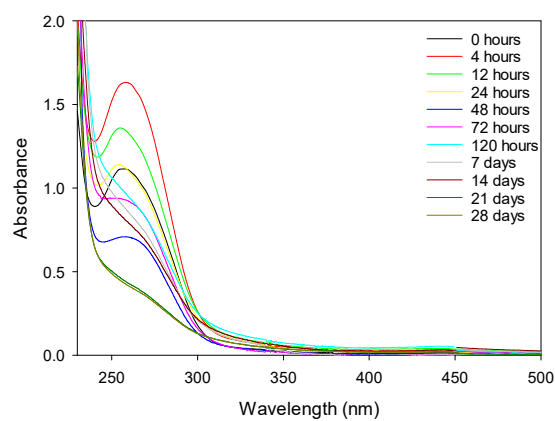
a)



b)

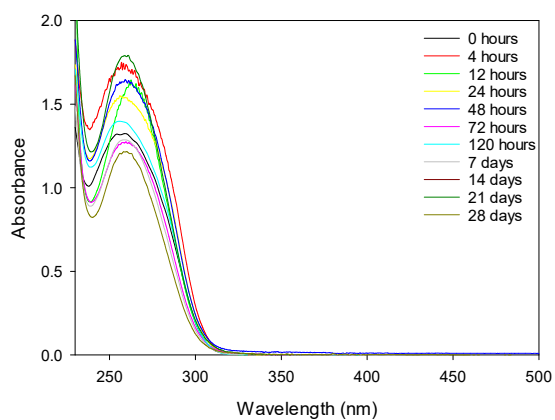


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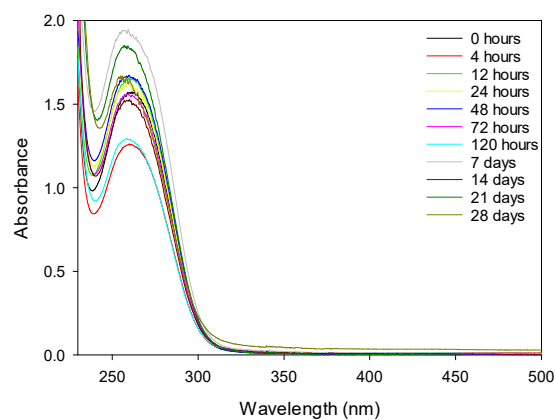


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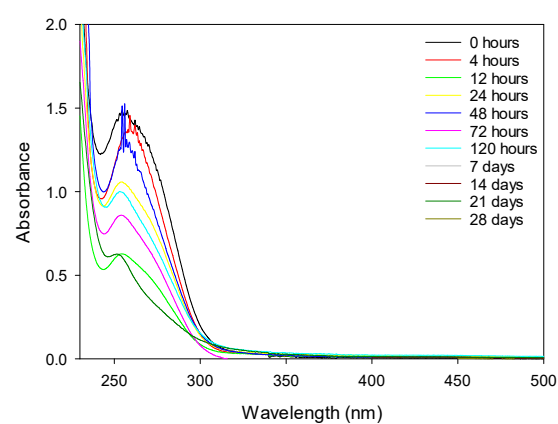
Figure S. 20. UV-VIS spectra for 10 K PVP capped cerium dioxide NMs exposed to a) 25, b) 45, c) 65 and d) 80 °C as a function of time.



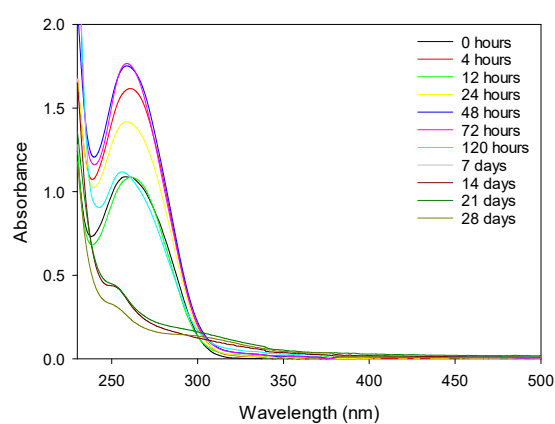
a)



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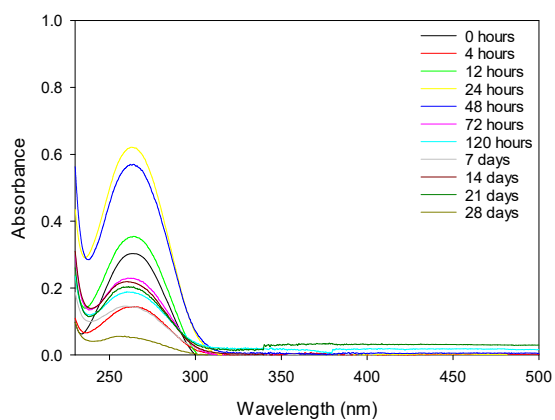
Figure S.21 UV-VIS spectra for 40 K PVP capped cerium dioxide NMs exposed to a) 25, b) 45, c) 65 and d) 80 °C as a function of time.

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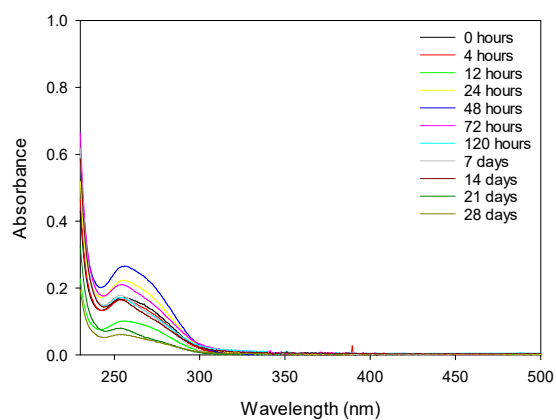
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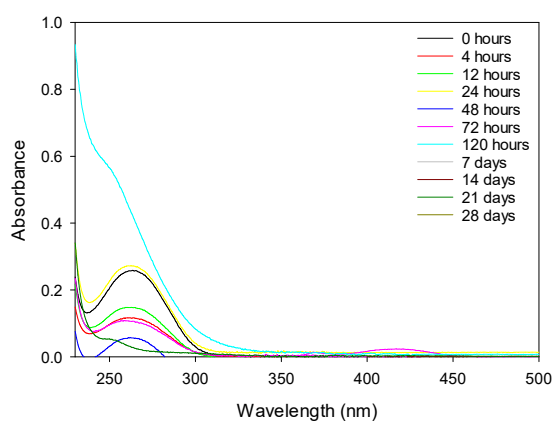
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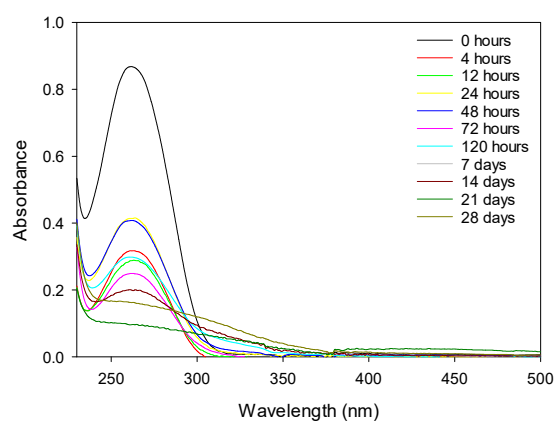
a)



b)



c)



d)

Figure S.22 UV-VIS spectra for 360 K PVP capped cerium dioxide NMs exposed to a) 25, b) 45, c) 65 and d) 80 °C as a function of time.

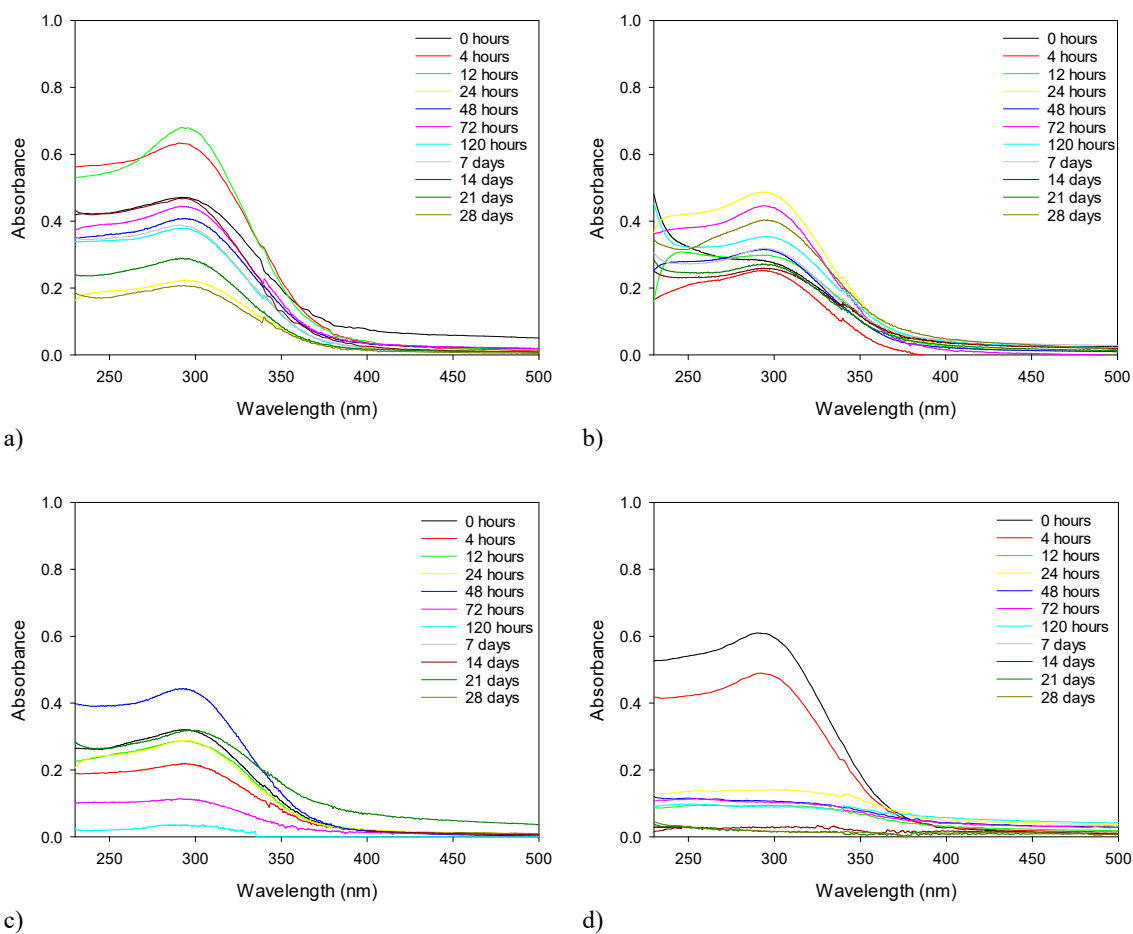


Figure S.23 UV-VIS spectra for uncapped ceria NMs exposed to a) 25, b) 45, c) 65 and d) 80 °C as a function of time.

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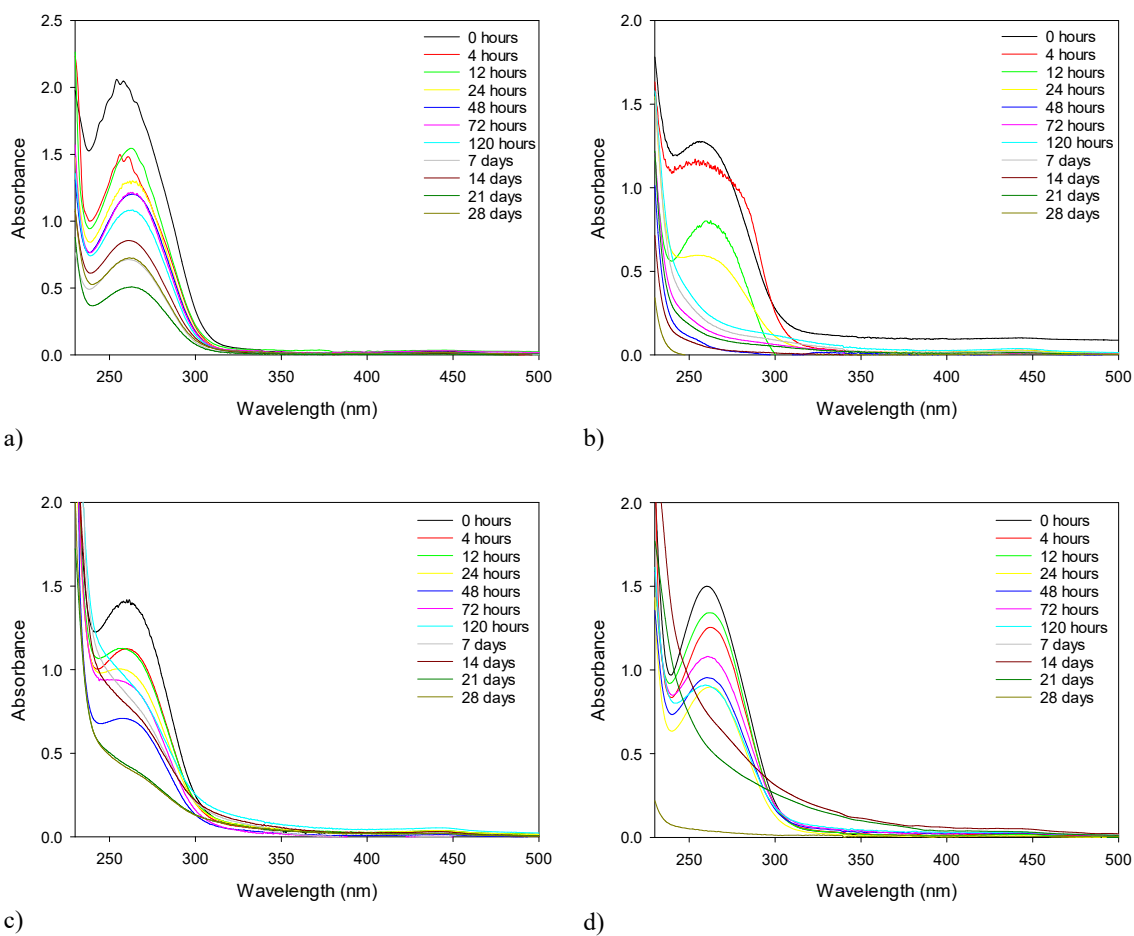


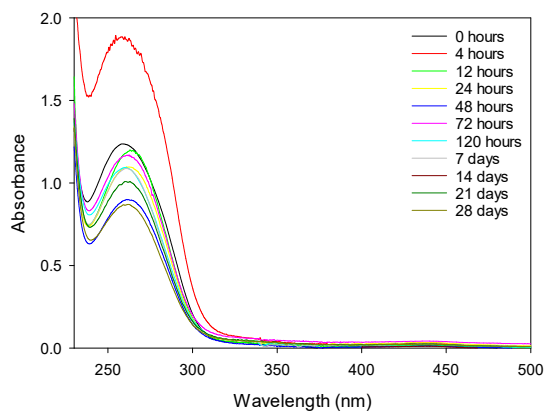
Figure S.24 UV-VIS spectra for 10 K PVP capped zinc oxide NMs exposed to a) 25, b) 45 c) 65 and d) 80 °C as a function of time.

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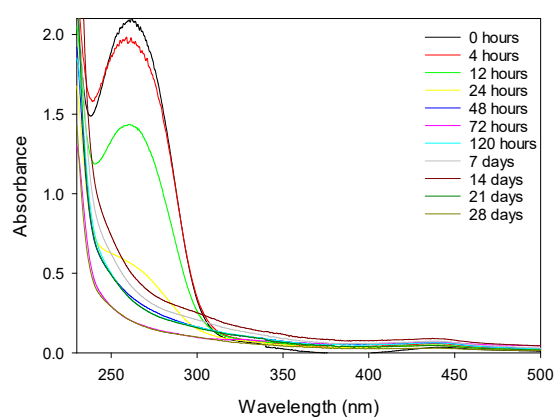
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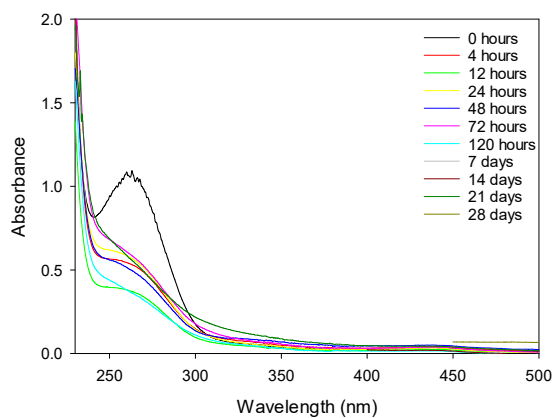
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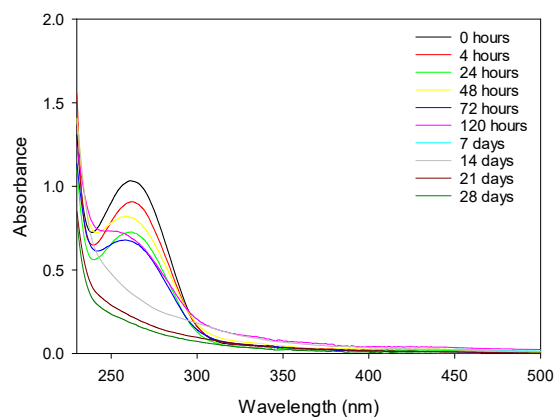
a)



b)



c)



d)

Figure S.25 UV-VIS spectra for 10 K PVP capped copper oxide NMs exposed to a) 25, b) 45, c) 65 and d) 80 °C as a function of time.

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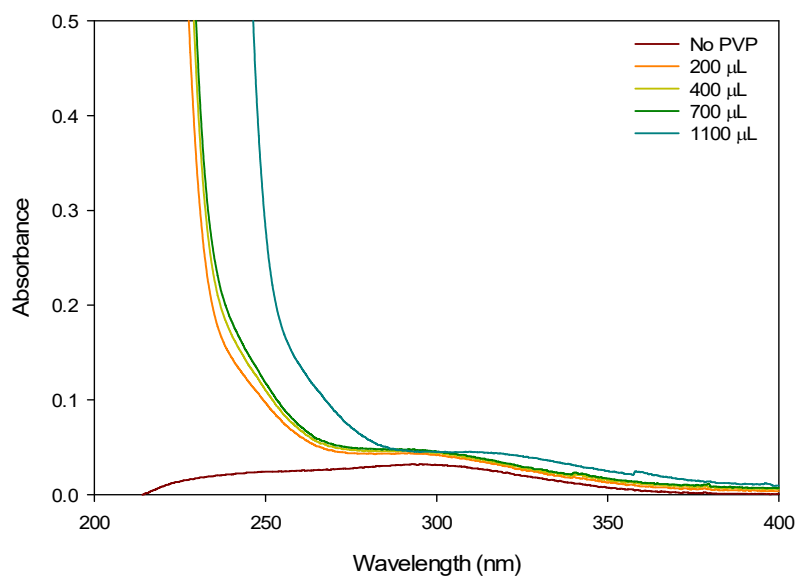


Figure S. 26 UV-VIS spectra showing increasing volumes of 4 µg/mL of a PVP dispersion added to uncapped ceria NPs as an indication that an increase in PVP concentration results in shielding of the metal oxide peak.