

## Supplementary Information

# Towards the development of antioxidant cerium oxide nanoparticles for biomedical applications: controlling the properties by tuning synthesis conditions.

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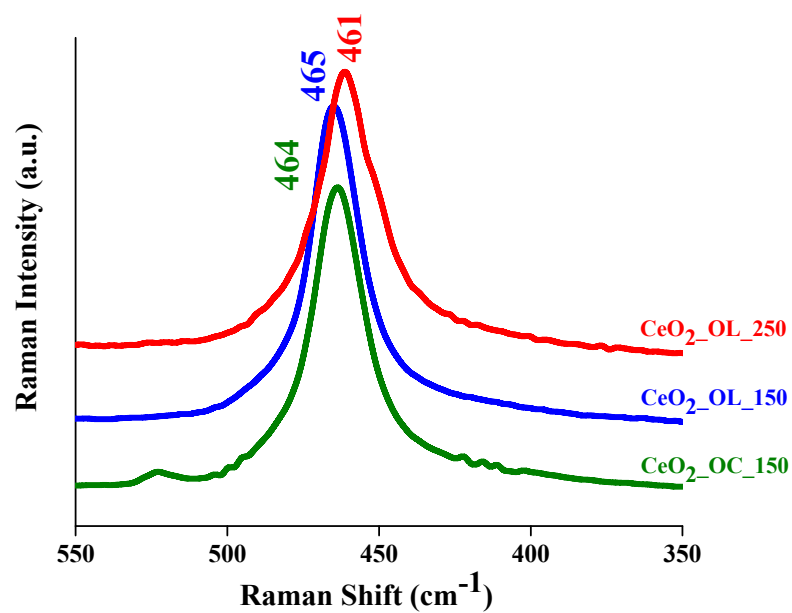
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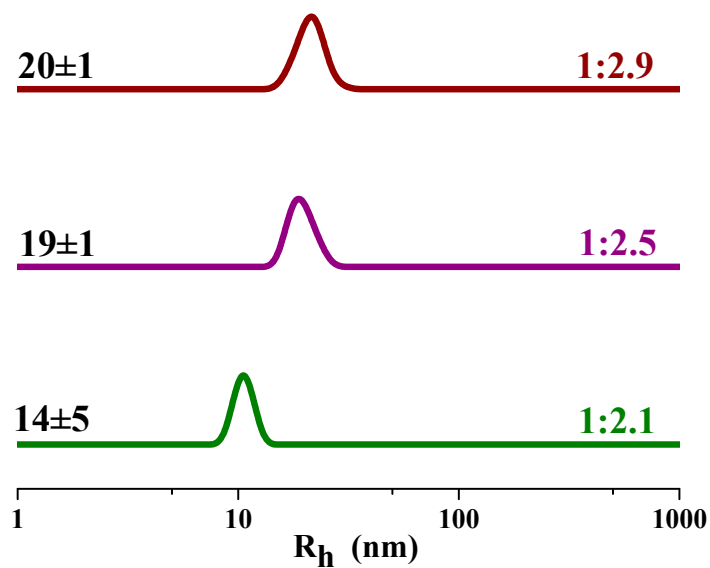
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### Evaluation of NP concentration

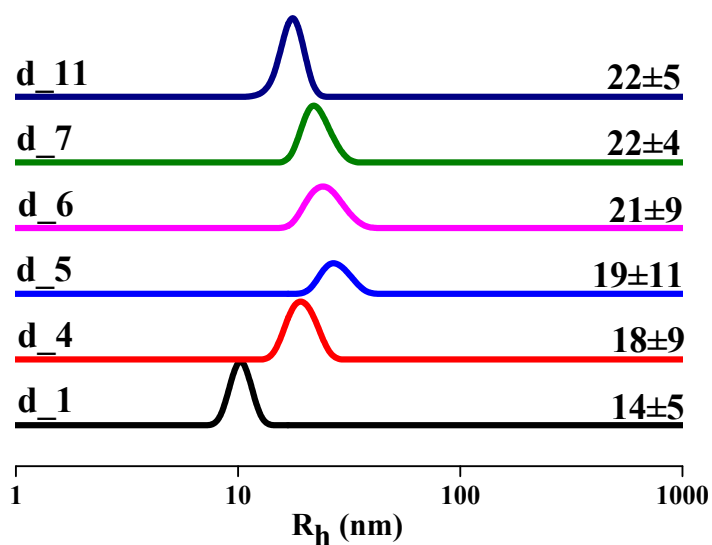
Ce concentration in nanoparticles samples was determined by ICP-MS in terms of mg/kg concentration. Considering a CeO<sub>2</sub> density of 7.6 g/cm<sup>3</sup> and the volume of NP core as experimentally determined by TEM images it was possible to estimate the weight of a single nanoparticle being 10<sup>-19</sup> g, corresponding to a nanoparticle molecular weight of about 299545.6 g/mol. We thus converted Ce concentration into NP molar concentration and used this value to determine the oleylamine and sodium oleate concentration needed for coating [1-2].



**Figure S1.** Raman spectra for the three CeO<sub>2</sub> samples: Green CeO<sub>2</sub>\_OC\_150 ( $\nu=464$  cm<sup>-1</sup>;  $\Delta\nu=20$  cm<sup>-1</sup>), Blue CeO<sub>2</sub>\_OL\_150 ( $\nu=465$  cm<sup>-1</sup>;  $\Delta\nu=20$  cm<sup>-1</sup>), Red CeO<sub>2</sub>\_OL\_250, ( $\nu=461$  cm<sup>-1</sup>;  $\Delta\nu=23$  cm<sup>-1</sup>).



**Figure S2.** Hydrodynamic radius distribution of CeO<sub>2</sub>\_OL\_250 NPs functionalized with a constant amount of sodium oleate at first day after preparation.



**Figure S3.** Hydrodynamic radius distribution over time of sample NPs:NaOl molar ratio 1:( $2.1 \times 10^6$ ).

## References

1. Luchini, A.; Gerelli, Y.; Fragneto, G.; Nylander, T.; Palsson, G. K.; Appavou, M.S.; Paduano, L. Neutron reflectometry reveals the interaction between functionalized SPIONs and the surface of lipid bilayers. *Colloids Surf. B* **2017**, *151*, 76-87.
2. Russo Krauss, I.; Picariello, A.; Vitiello, G.; De Santis, A.; Koutsioubas, A.; Houston, J. E.; Fragneto, G.; Paduano, L. Interaction with human serum proteins reveals biocompatibility of phosphocholine-functionalized SPIONs and formation of albumin-decorated nanoparticles. *Langmuir* **2020**, *36*, 8777-8791.