

Supplementary Material

Optical and electronic properties of silver nanoparticles embedded in cerium oxide

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UV-Vis Absorbance Spectra

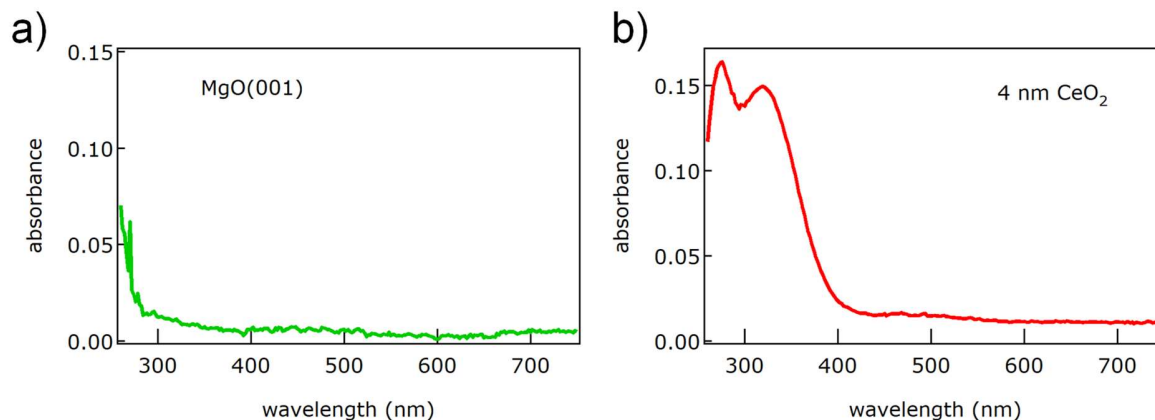


Figure S1: Absorbance spectra of a) the MgO(001) substrate and b) a 4 nm CeO₂ film supported on MgO(001).

Calculated polarizabilities

The out-of-plane and in-plane polarizability of a system made of isolated Ag spheroids embedded in a cerium oxide matrix are calculated using the Maxwell Garnett theory as:

$$\alpha_{\perp,\parallel}(\omega) \propto \frac{\varepsilon_{Ag}(\omega) - \varepsilon_{CeO_2}}{\varepsilon_{CeO_2} + L_{\perp,\parallel}[\varepsilon_{Ag}(\omega) - \varepsilon_{CeO_2}]}$$

where $\varepsilon_{Ag}(\omega)$ is the dielectric function of Ag, ε_{CeO_2} is the dielectric constant of CeO₂, $L_{\perp,\parallel}$ are the depolarization factors in the out-of-plane and in-plane directions. The depolarization factors for different aspect ratios are given in table S1.

Table S1. Aspect ratio (ratio between in-plane and out-of-plane size) and depolarization factors used for the calculations.

Aspect ratio	L_{\perp}	L_{\parallel}
2	0.53	0.24
3	0.63	0.18
0.67	0.23	0.38