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Electronic Supplementary Information (ESI)

Au-Pd NPs immobilised on nanostructured ceria and titania: impact of support morphology on the catalytic activity for selective oxidation

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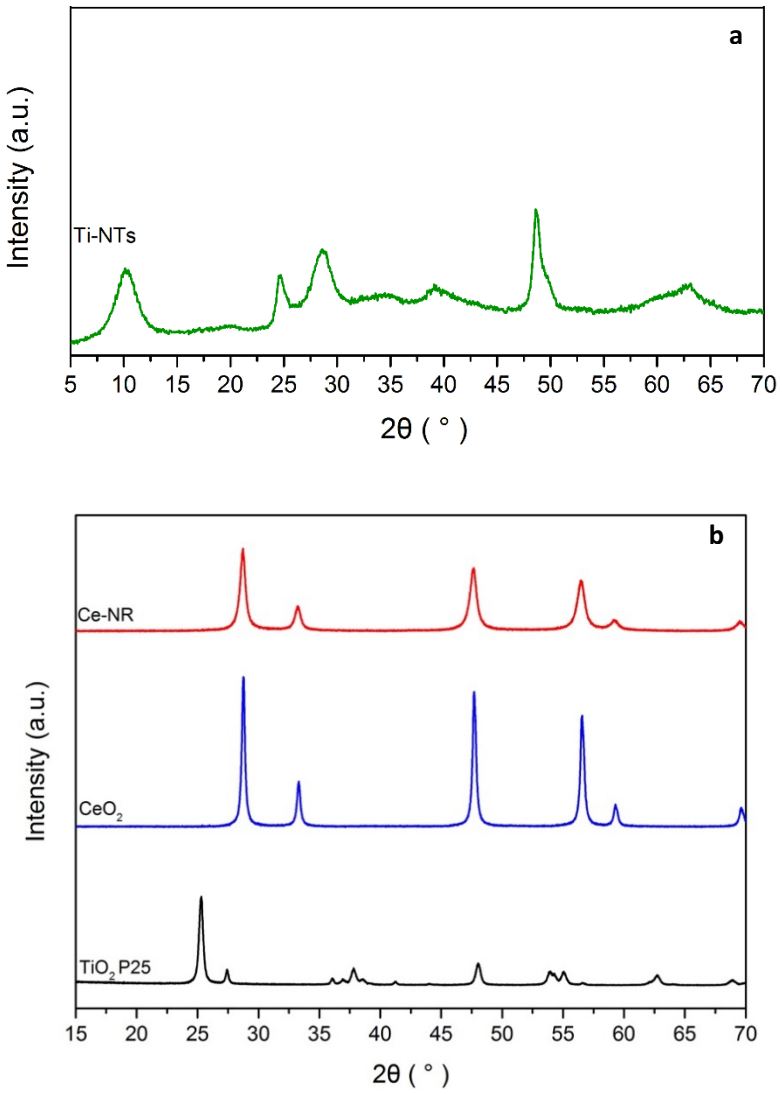

Figure S1. X-ray powder diffraction patterns of Ti-NTs (a) and Ce-NRs, CeO_2 and TiO_2 P25 nanopowders (b).

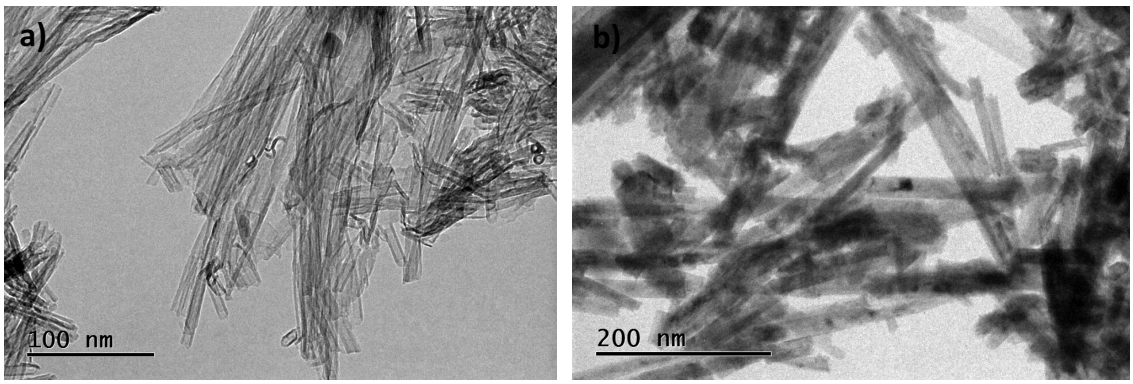

Figure S2. TEM images of a) Ti-NTs, and b) Ce-NRs.

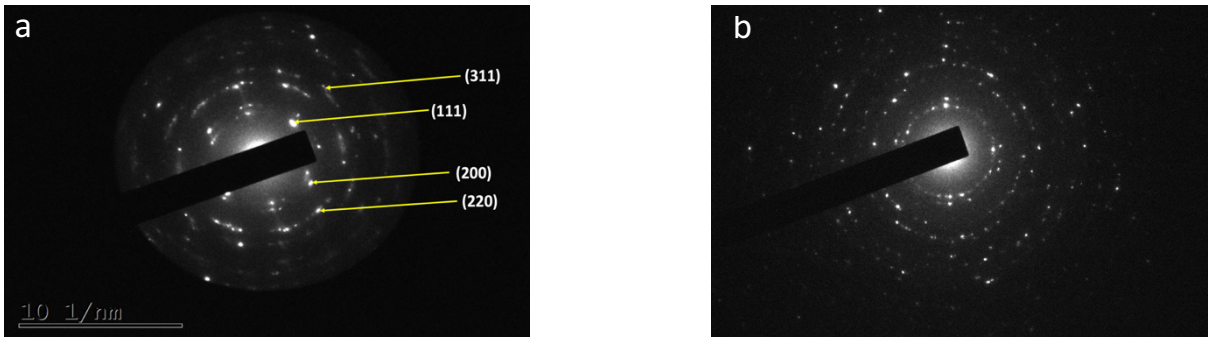

Figure S3. Selected area electron diffraction (SAED) patterns for (a) Ce-NR and (b) CeO_2 obtained with the JEOL JEM-2100F. The ring patterns confirms the polycrystalline nature of the as-Ce-NR and CeO_2 nanopowder. The rings are indexed against the CeO_2 fluorite structure.

Table S1. Textural properties determined from N_2 adsorption-desorption measurements.

Support	SBET (m^2/g)	Pore volume (cm^3/g)	Pore diameter (nm)
Ti-NT	236	0.51	7.7
Ce-NR	61.7	0.34	17.3

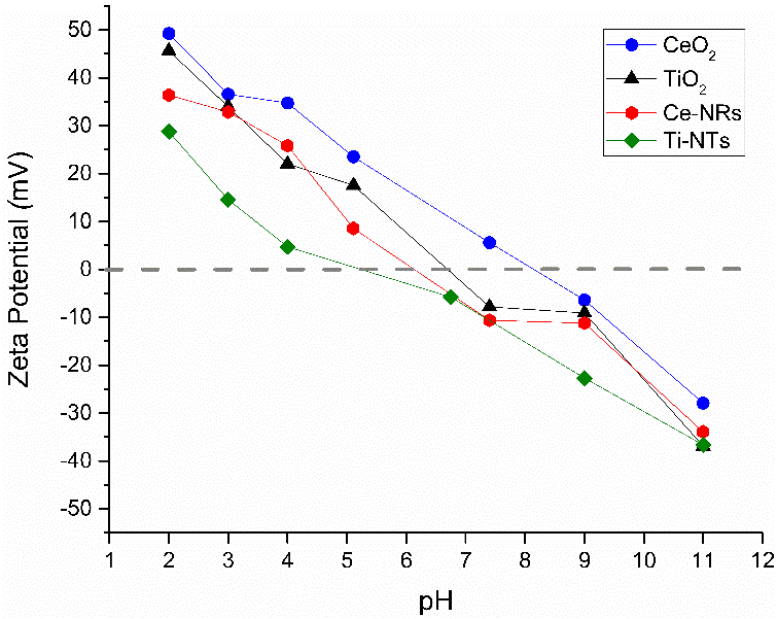

Figure S4. Zeta potential as a function of pH for Ce-NRs, CeO_2 nanopowders, Ti-NTs, and TiO_2 P25.

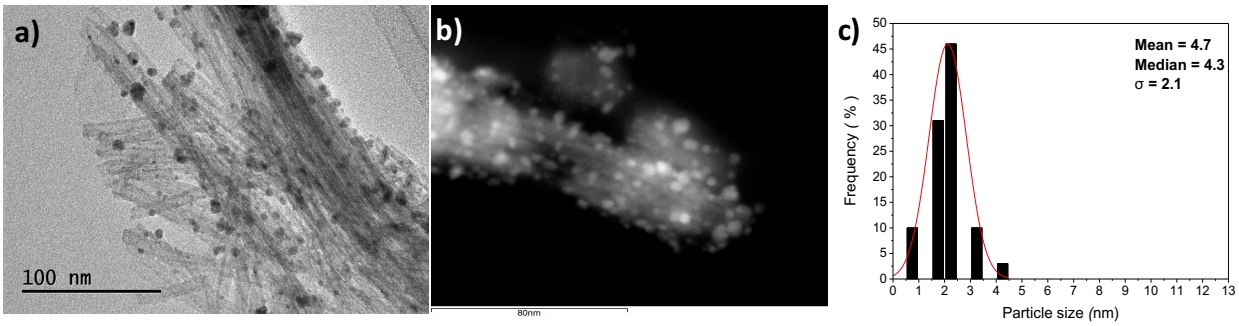

Figure S5. a) TEM image, b) STEM image for Au-Pd/Ti-NT, and c) corresponding particle size distribution.

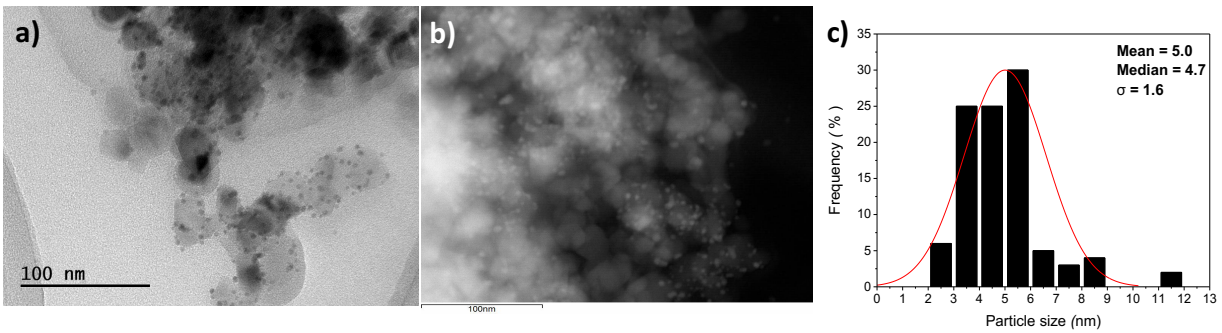

Figure S6. a) TEM image, b) STEM image for Au-Pd/TiO_2, and c) corresponding particle size distribution.

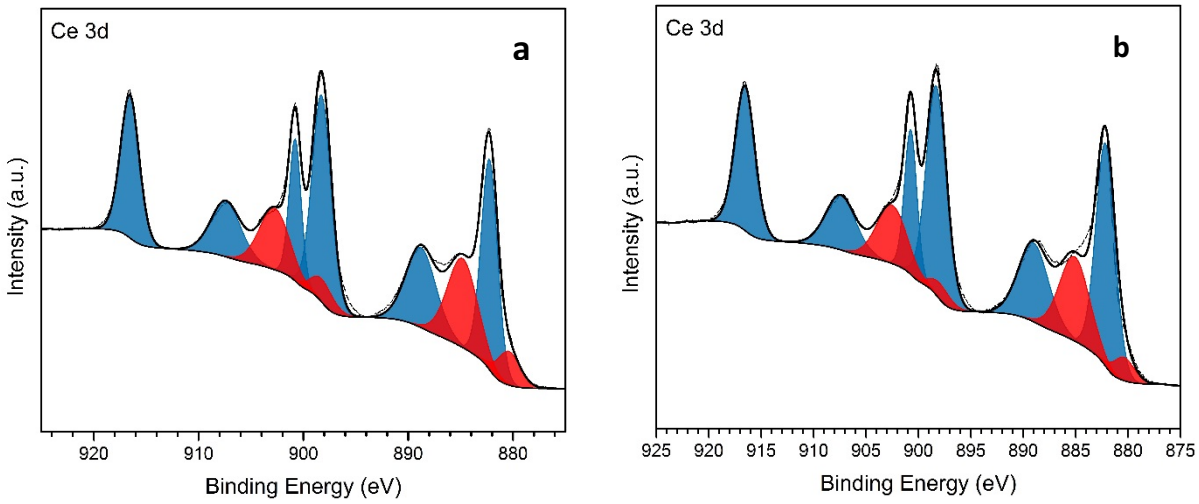

Figure S7. XPS spectra of Ce 3d for (a) Ce-NR and (b) CeO_2 nanopowder.

Table S2. Concentration of Ce^{3+} and O species for the ceria supports from XPS.

Support	Ce^{3+}(at.%)[a]	O_α (at.%) [b]	O_β (at.%) [b]	O_γ (at.%) [b]
Ce-NR	31.0	61.7	35.2	3.0
CeO_2	27.3	77.5	20.1	2.2

[a] Determined from the Ce 3d XPS spectra.

[b] Determined from the O1s XPS spectra.

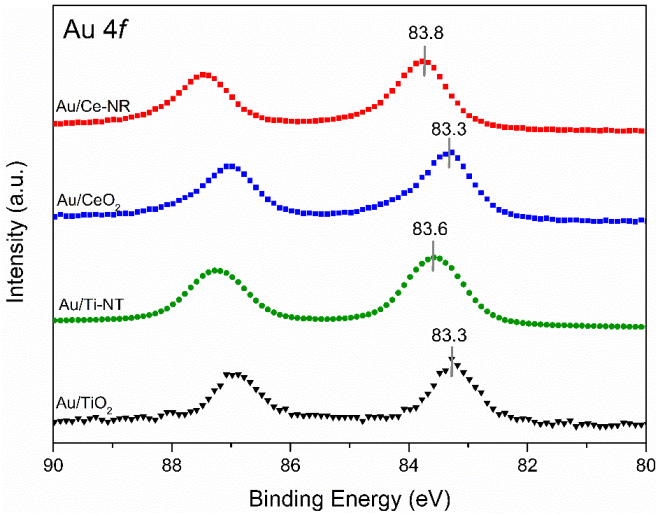

Figure S8. XPS spectra of Au 4f for monometallic catalyst samples Au/Ce-NR, Au/CeO_2, Au /Ti-NT and Au-Pd/TiO_2

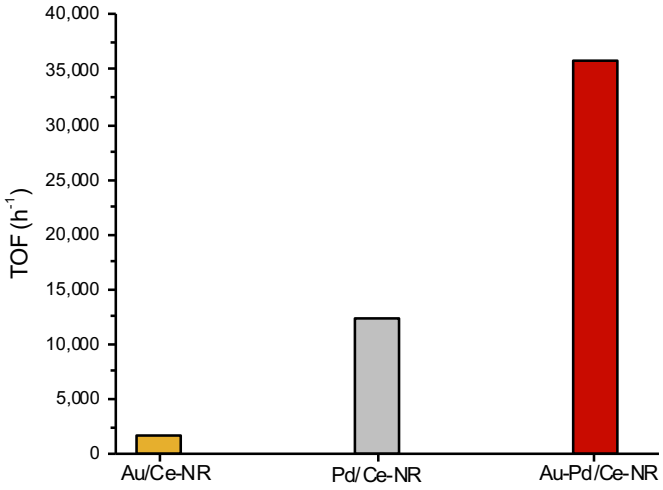

Figure S9. TOF (h^{-1}) for monometallic and bimetallic catalysts prepared by sol-immobilisation. Reaction conditions: T= 120°C, pO_2= 2 bar, stirring rate=1,000 rpm, molar ratio of benzyl alcohol/metal = 50,000. TOF calculated after 0.5 hour.