

## ELECTRONIC SUPPLEMENTARY INFORMATION (ESI)

### Ceria doping boosts methylene blue photodegradation in titania nanostructures

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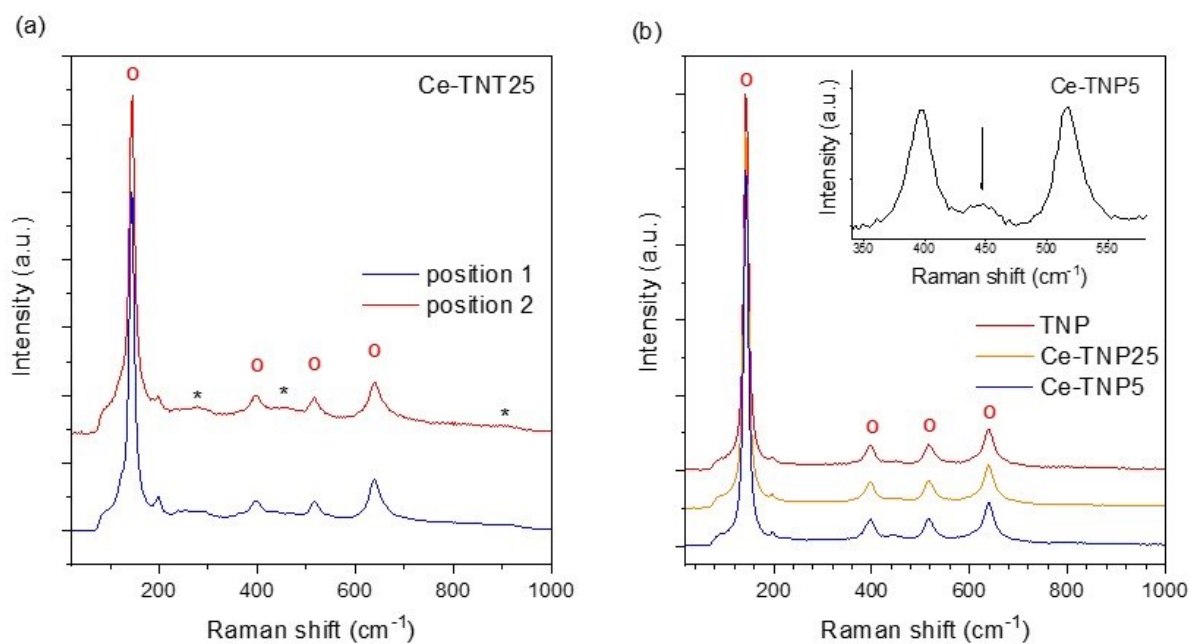
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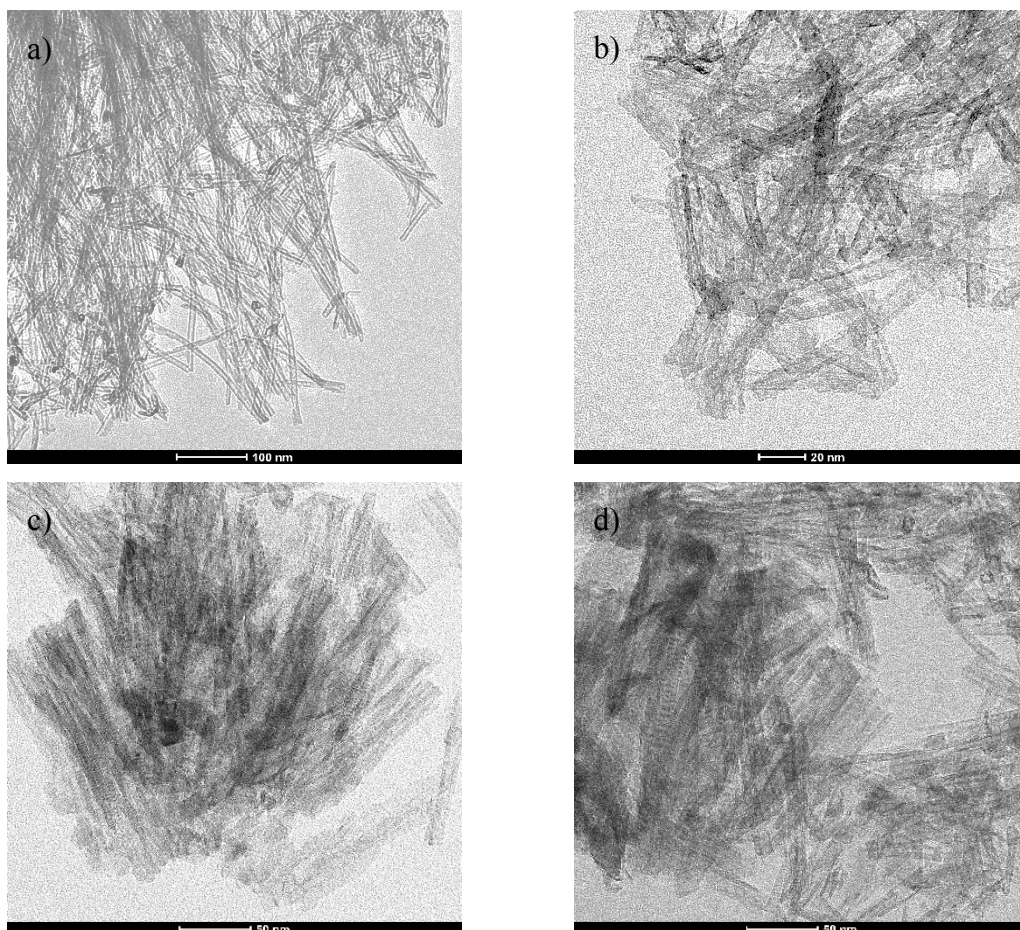
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**Table S1.** XPS binding energy values of O 1s and Ti 2p<sub>3/2</sub> core level signals of ceria-titania nanotubes and nanoparticles samples.

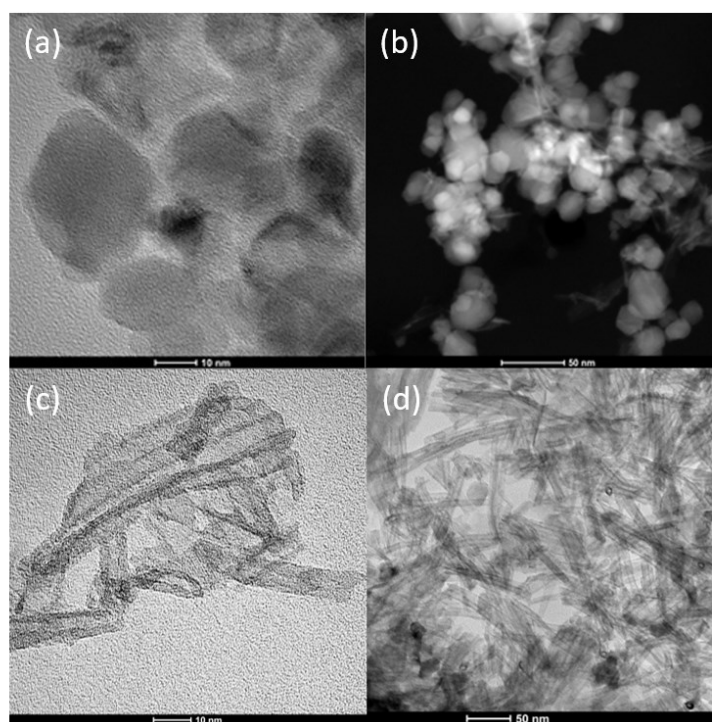
Sample	Binding Energy values (eV)			
	O 1s		Ti 2p	
TNT	530.1 (90.9)	531.6 (9.10)	-	458.6
CeTNT0.25	529.7 (87.0)	531.0 (13.0)	-	458.2
CeTNT0.5	529.8 (86.9)	531.2 (13.1)	-	458.5
CeTNT1	529.8 (92.1)	531.2 (7.90)	-	458.3
CeTNT2.5	529.9 (89.3)	531.3 (10.7)	-	458.3
CeTNT5	530.0 (89.1)	531.5 (10.9)	-	458.4
TNP	529.7 (95.7)	531.5 (4.30)	-	458.0
CeTNP0.25	529.7 (69.4)	531.4 (18.4)	533.5 (12.2)	458.2
CeTNP0.5	529.7 (87.9)	531.3 (9.80)	534.1 (2.30)	458.2
CeTNP1	529.7 (88.9)	531.5 (9.00)	534.0 (2.10)	458.2
CeTNP2.5	529.8 (84.2)	531.7 (12.5)	534.0 (3.30)	458.3
CeTNP5	529.8 (91.5)	531.4 (7.40)	533.7 (1.41)	458.1



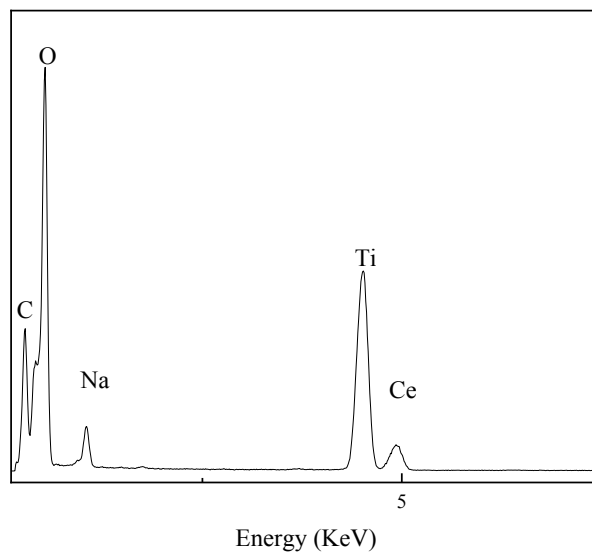
**Figure S1.** Raman spectra of (a) Ce-TNT25 recorded at two different positions and (b) TNP, Ce-TNP25 and Ce-TNP50. Red circles mark anatase peaks. Asterisks in (b) mark weak peaks coming from reagents. Inset in (a): expanded view of the Ce-TNP5 sample, highlighting the presence of Rutile phase (black arrow).



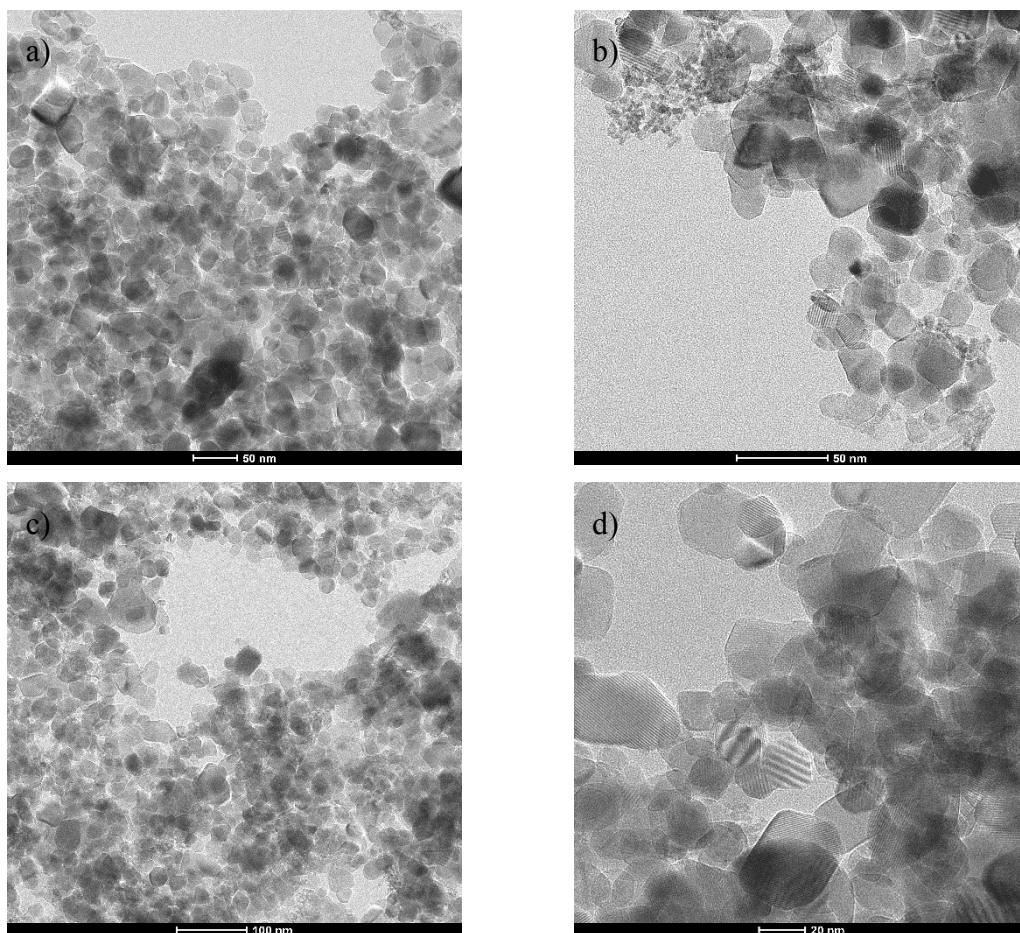
**Figure S2.** Representative HRTEM of nanotube systems: a, b) CeTNT2.5 and c, d) CeTNT5 sample.



**Figure S3.** HRTEM micrographs of pure titania: (a)-(b) TNP sample; (c)-(d) TNT sample.

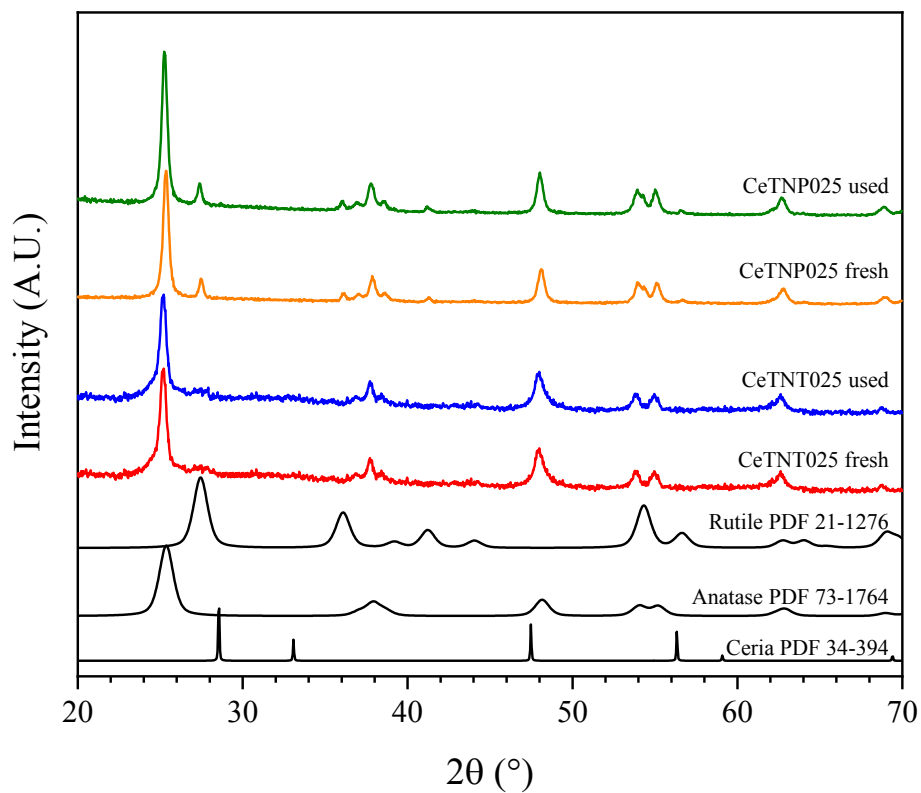


**Figure S4.** EDX spectrum of CeTNT5.



**Figure S5.** Representative HRTEM images of nanoparticle systems: a, b) CeTNP2.5 and c, d) CeTNP5.





**Figure S6.** X-ray diffraction patterns of the best performing samples, CeTNT025 and CeTNP025, before (fresh) and after (used) 3-cycle catalytic activity under UV light irradiation.