

Supporting Information

Biotransformation of Ceria Nanoparticles in Cucumber Plants

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Author Contributions

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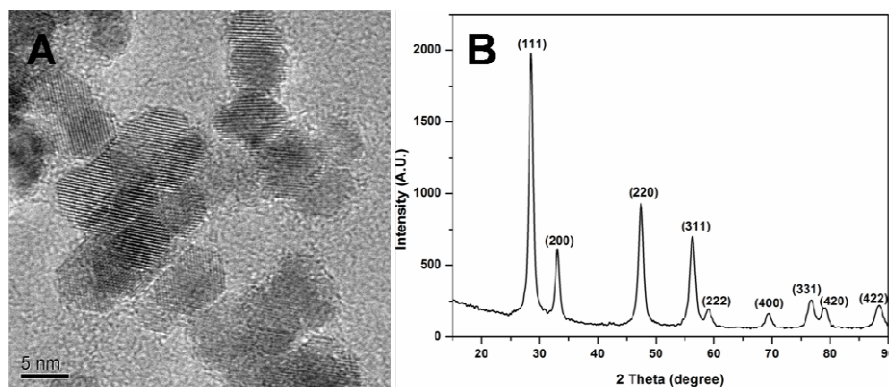


Figure S1. TEM image (A) and XRD pattern (B) of CeO₂ NPs

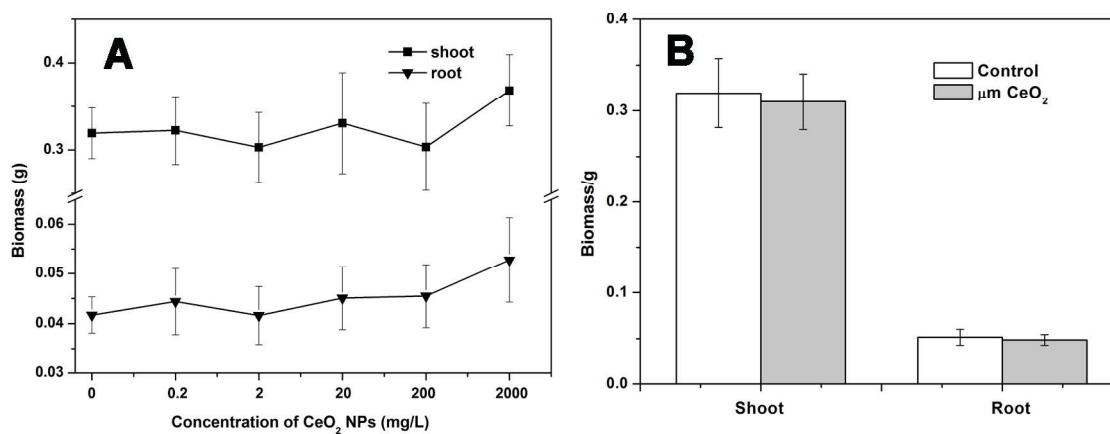


Figure S2. Biomass of cucumber treated with 7 nm CeO₂ (A) and 2000 mg/L μm-CeO₂ (Sigma Aldrich, USA) (B) for 21 d. Neither nanoparticulate nor bulk CeO₂ shows toxicity to cucumber biomass production even up to 2000 mg/L.

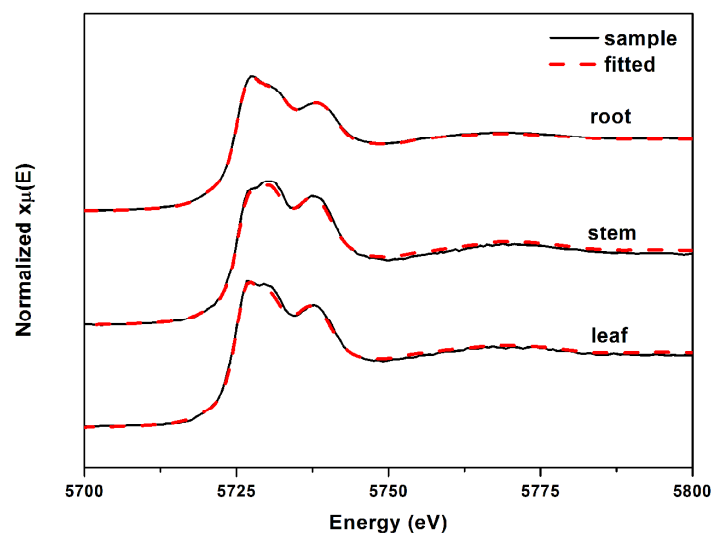


Figure S3. LCF results of XANES Ce L_{III}-edge normalized spectra in cucumber root, leaf and stem. Fitting parameters are respectively as follows: root (R-factor= 0.000120, chi-square= 0.01782), stem (R-factor= 0.001095, chi-square= 0.1749) and leaf (R-factor= 0.000705, chi-square= 0.09152), which indicated the fitting results are convincing.

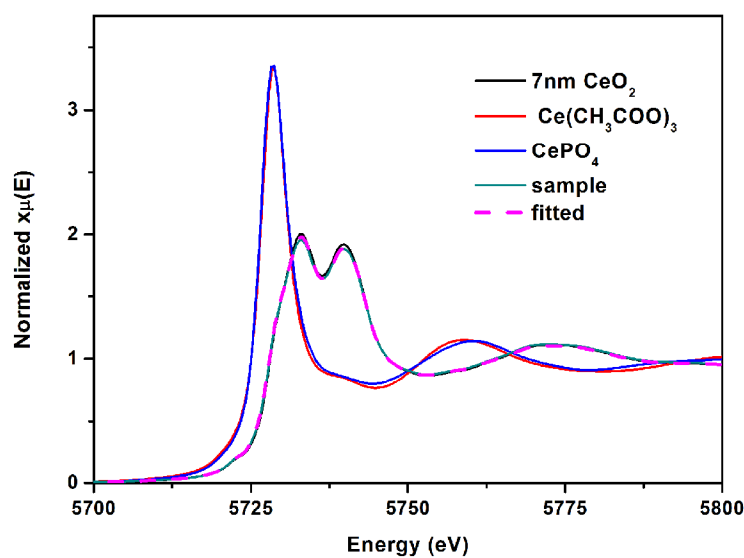


Figure S4. XANES Ce L_{III}-edge normalized spectra of the residual material in the exposure solution at the end of the growth period. Dash line indicates the LCF fitted line of the sample spectra. Fitting parameters (R-factor=0.000059; chi-square= 0.00987) suggest that the fitting result is convincing.

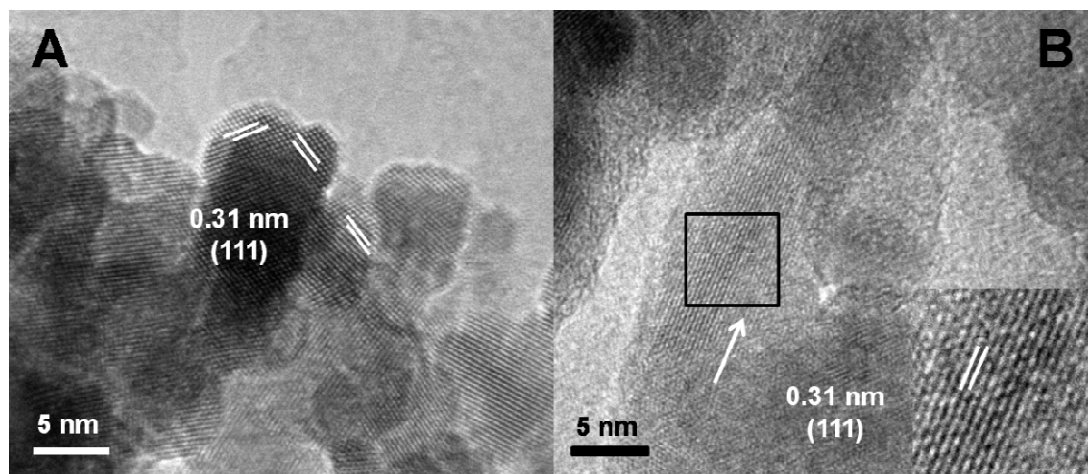


Figure S5. HRTEM images of CeO₂ NPs incubated in media KH₂PO₄ (A) and KH₂PO₄ + Vc (B) for 21 days. Inner picture in B shows the fringe lattice in the rectangle area.

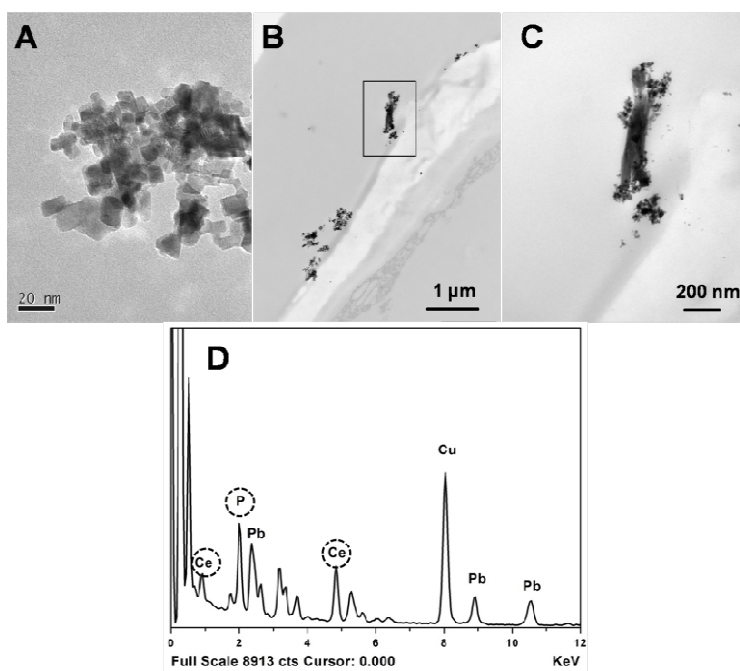


Figure S6. (A) TEM image of commercial CeO₂ NPs; (B) TEM image of root epidermis of cucumber treated with 2000 mg/L commercial CeO₂ NPs; (C) magnification of rectangle area in (B); (D) EDS spectrum collected from the NPs in (C).

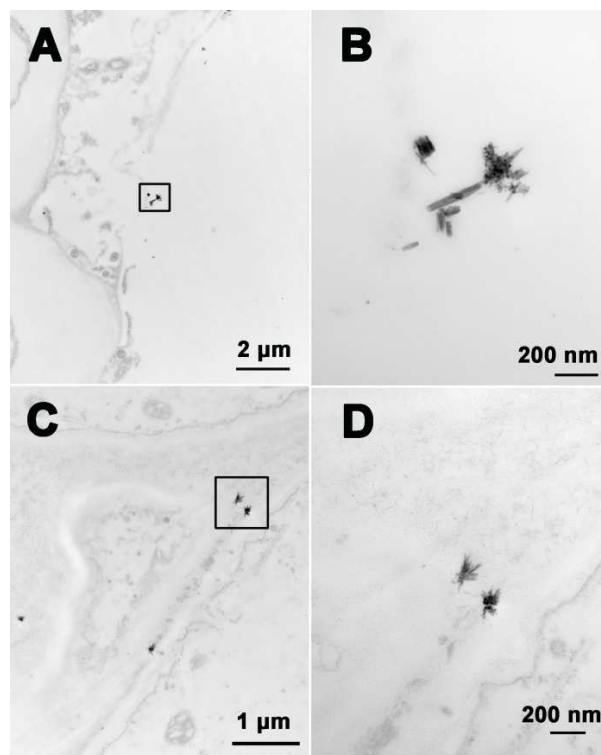


Figure S7. TEM images of roots of soybean treated with 7 nm CeO₂ NPs. (A) image of root epidermis; (B) magnification of rectangle area in (A); (C) image of intercellular region; (D) magnification of rectangle area in (C).