

Supplementary Information

Breathable, Water-Repellent γ -MnOOH Nest by Vapor-Assisted Conversion

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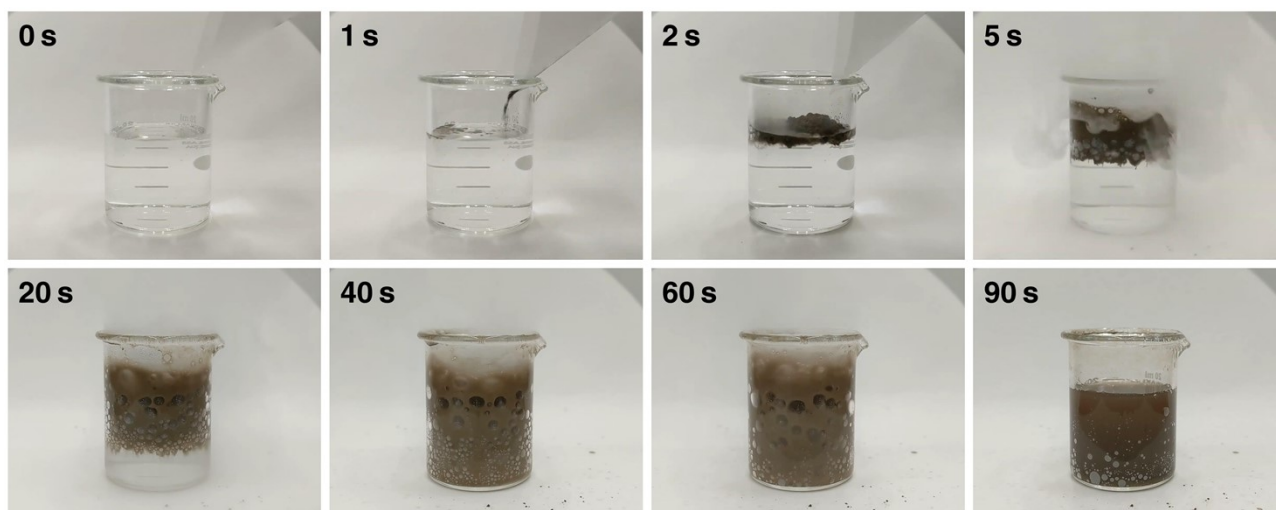


Figure S1. Time-lapse photographs of an H₂O₂ solution following the addition of MnCO₃ powder.

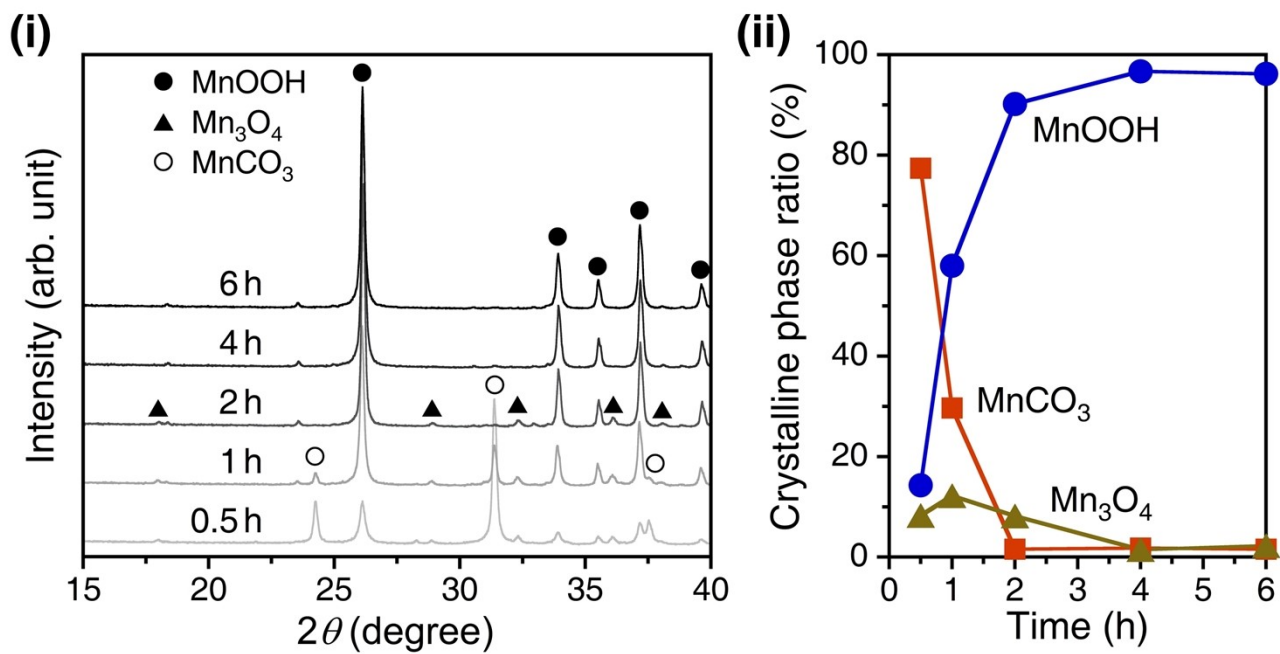


Figure S2. (i) XRD patterns and (ii) semi-quantitative analysis of the crystalline phase composition of MnCO₃ powder samples after exposure to 5% H₂O₂ vapor.

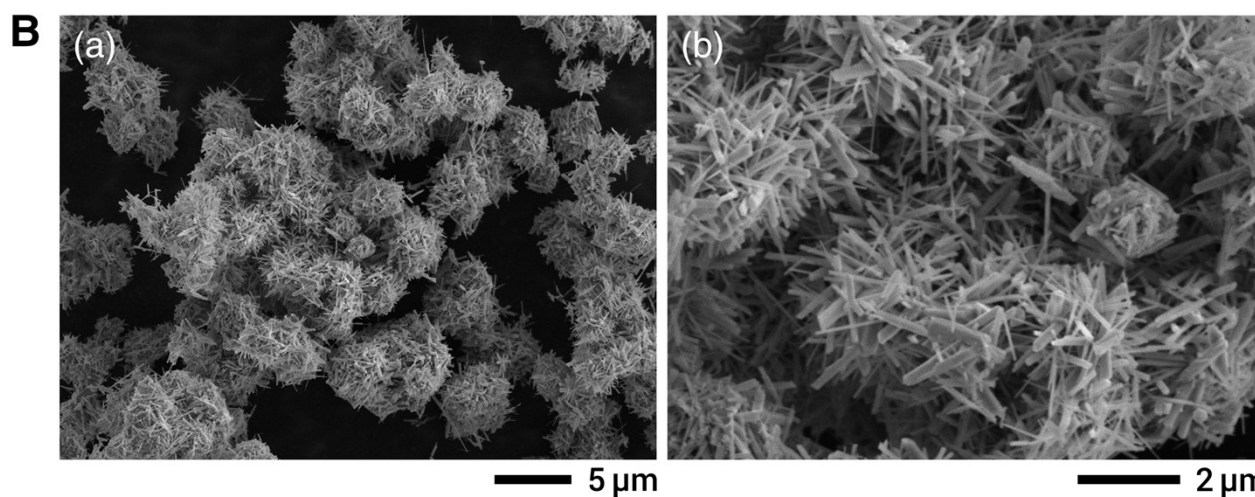
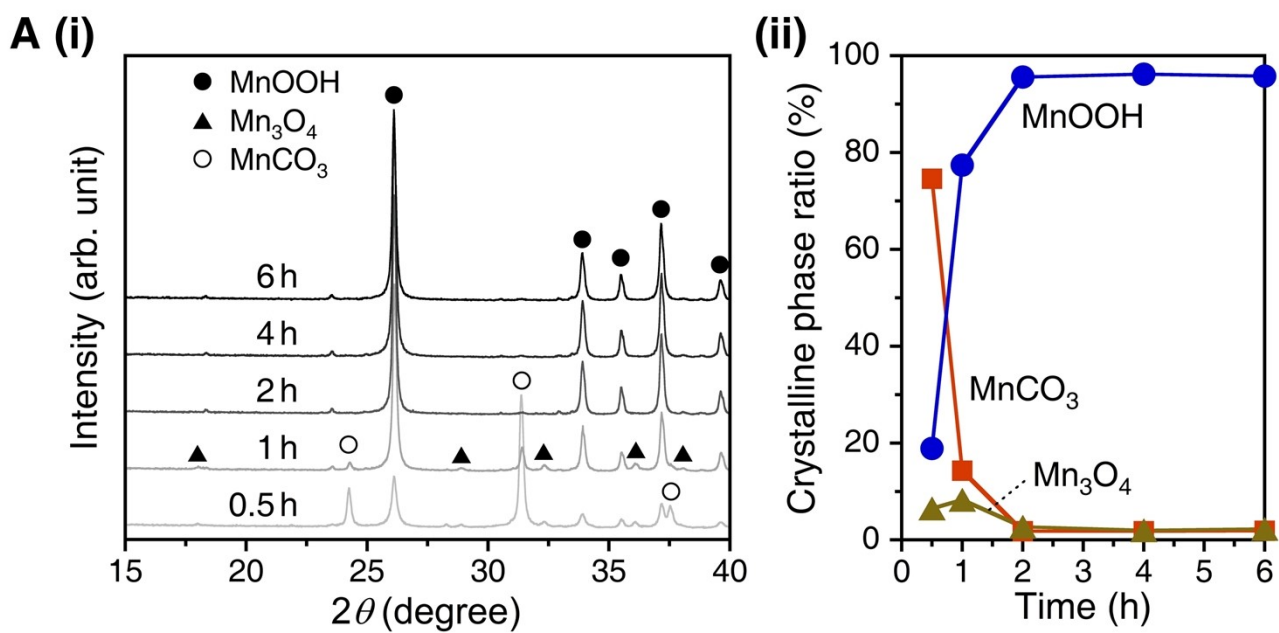


Figure S3. (A) (i) XRD patterns and (ii) semi-quantitative analysis of the crystalline phase composition of MnCO_3 powder samples after exposure to 10% H_2O_2 vapor. (B) SEM images of the sample after 6 h: (a) overview and (b) magnified view.

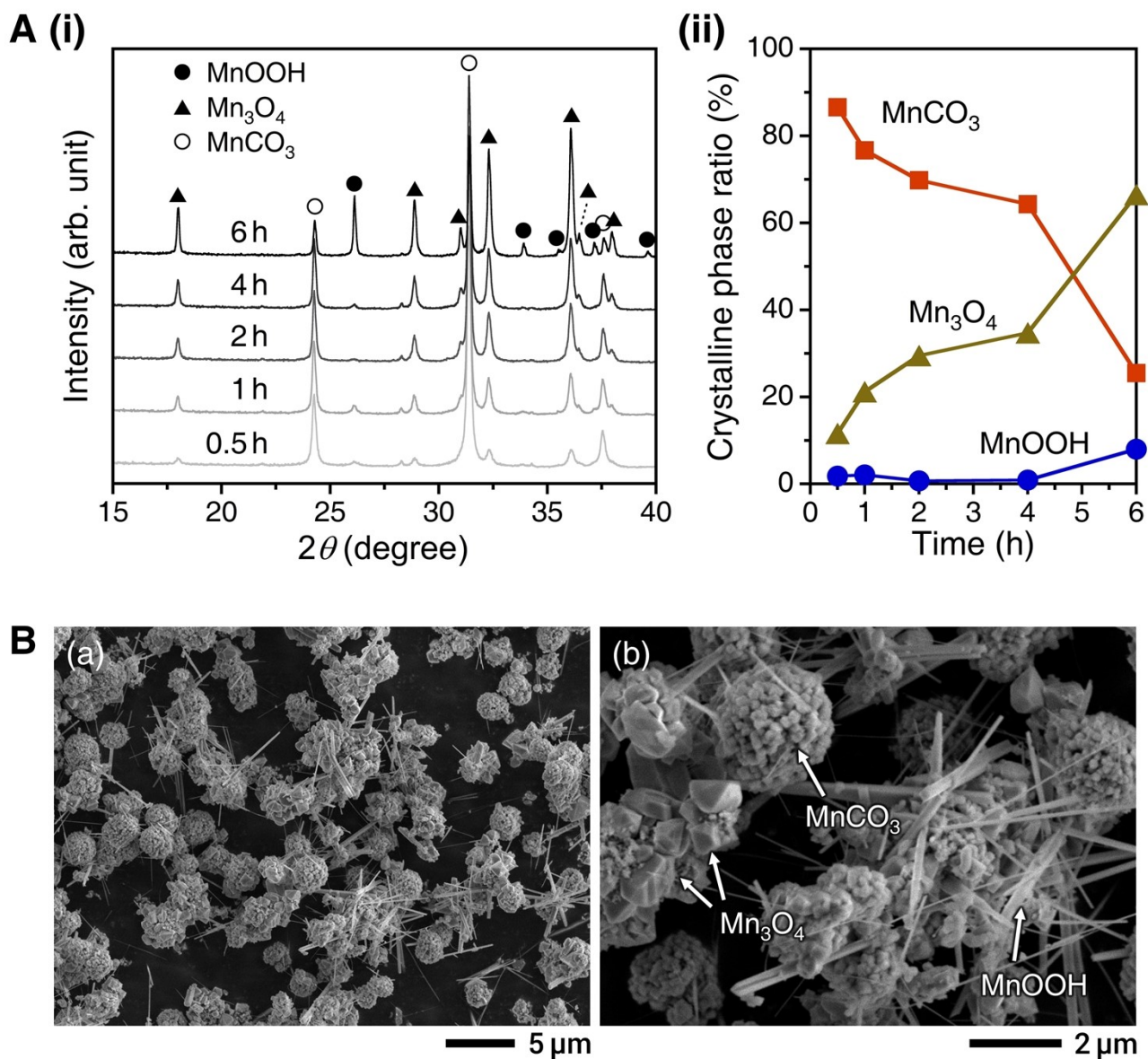


Figure S4. (A) (i) XRD patterns and (ii) semi-quantitative analysis of the crystalline phase composition of MnCO_3 powder samples after exposure to water vapor. (B) SEM images of the sample after 6 h: (a) overview and (b) magnified view.

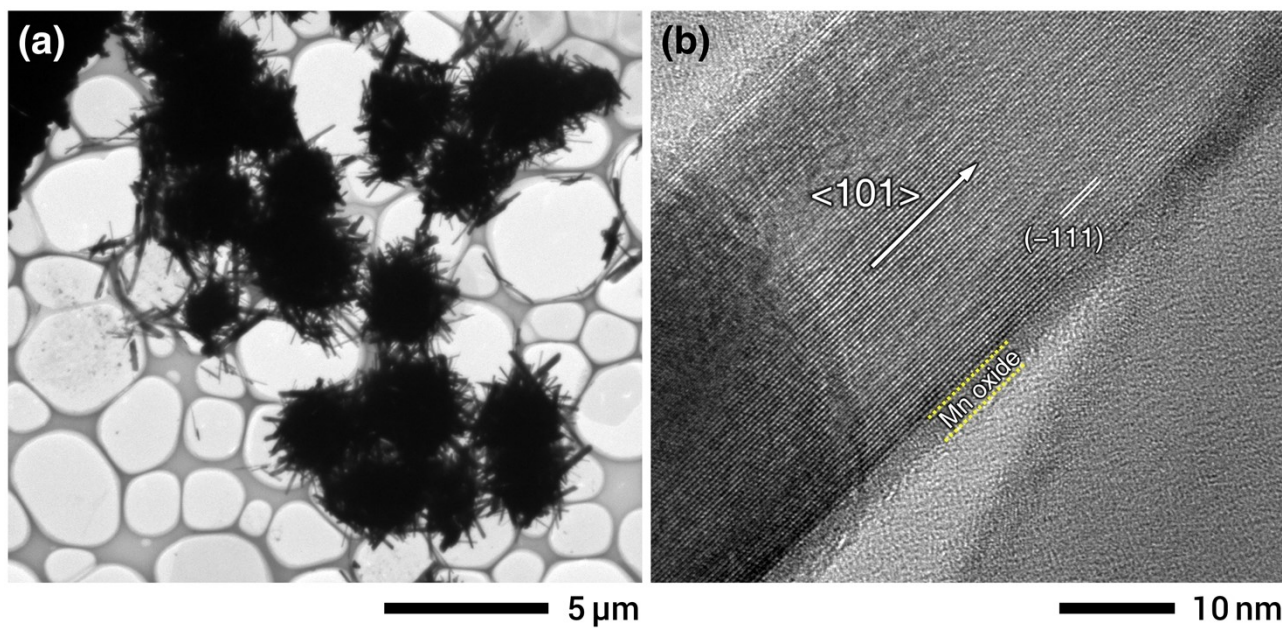


Figure S5. (a) TEM image of needle-like γ -MnOOH aggregates obtained after 2 h of exposure to 10% H_2O_2 vapor. (b) HR-TEM image of the needle-like γ -MnOOH particle.

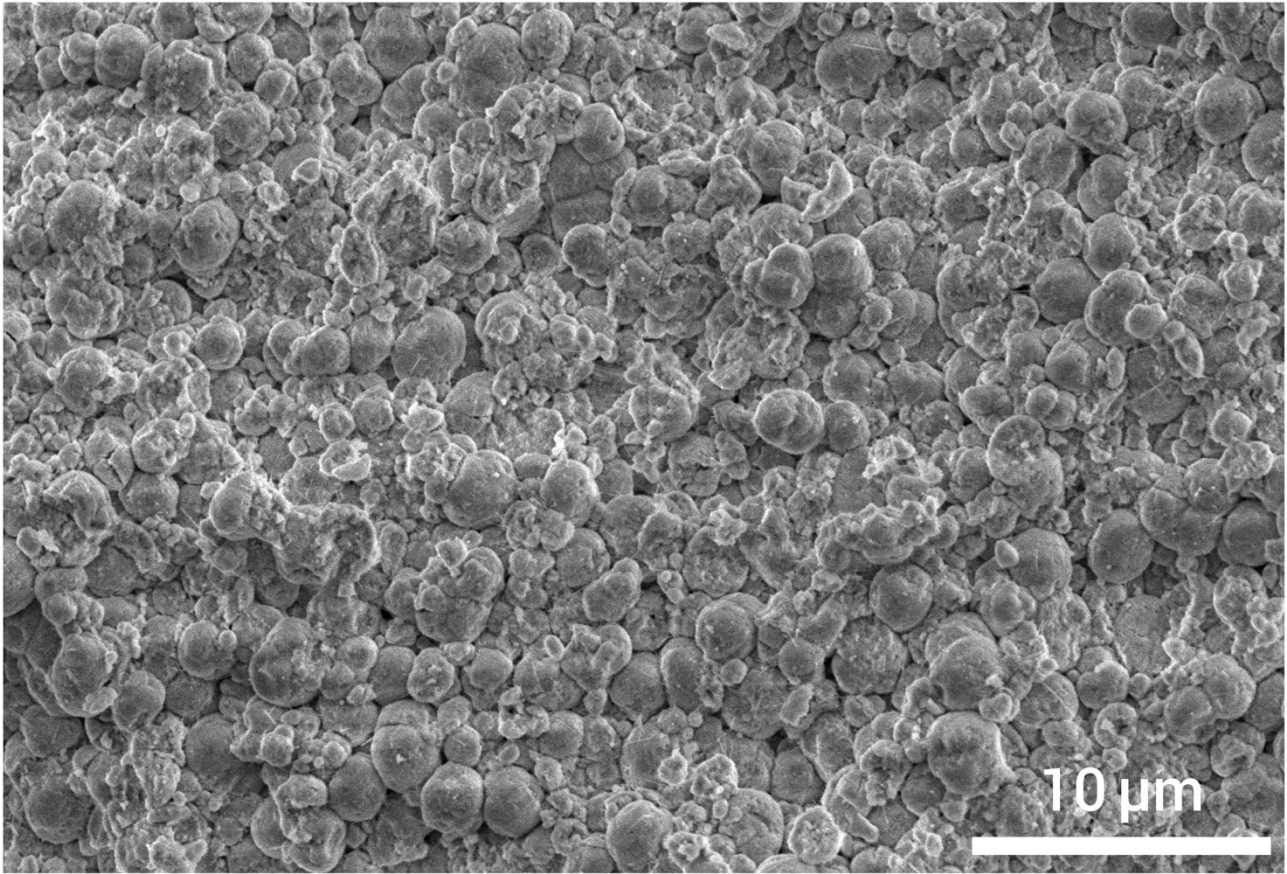


Figure S6. SEM image of the MnCO₃ powder compact fabricated via hydrothermal hot-pressing.

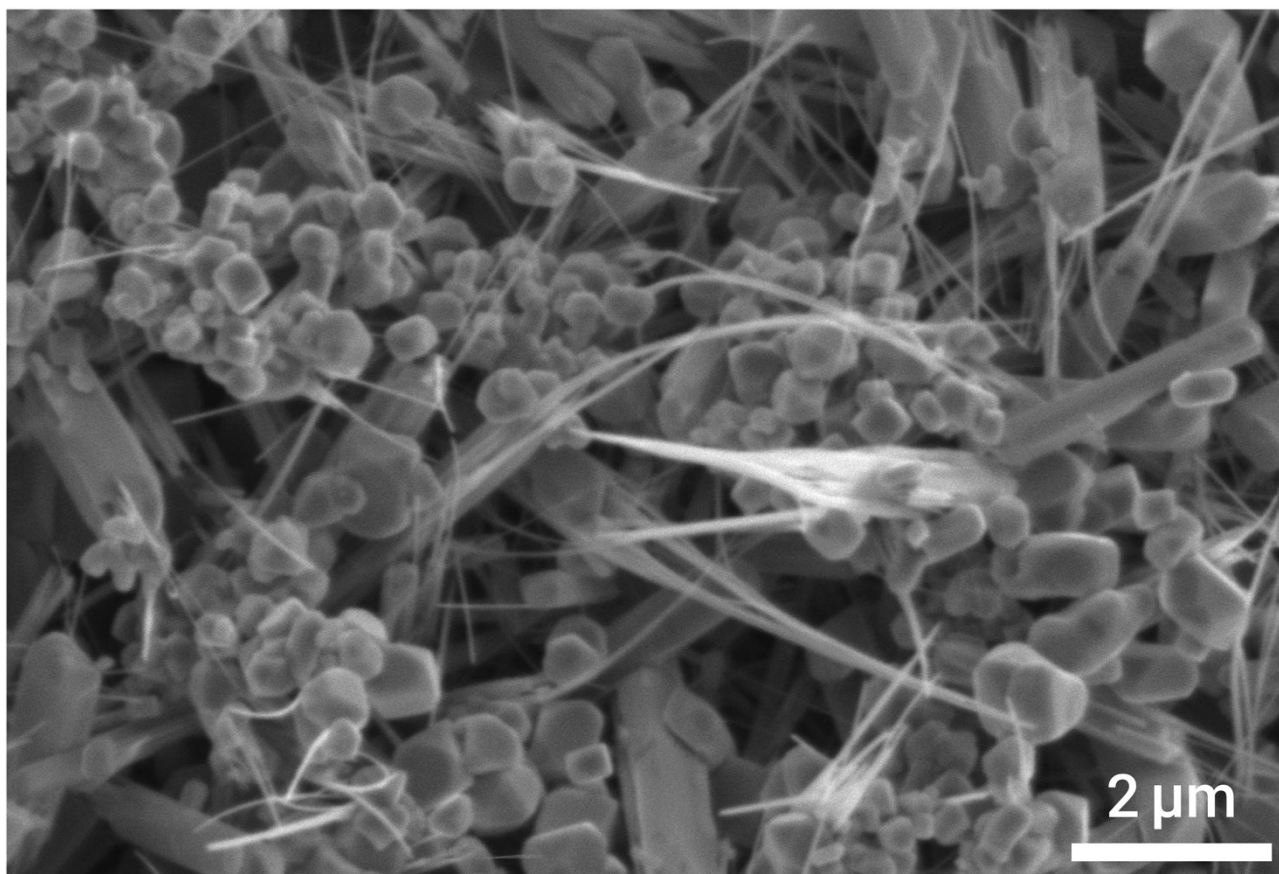


Figure S7. SEM image of the surface of a hydrothermally vapor-treated MnCO₃ compact after 12 h of exposure to 30% H₂O₂ vapor.

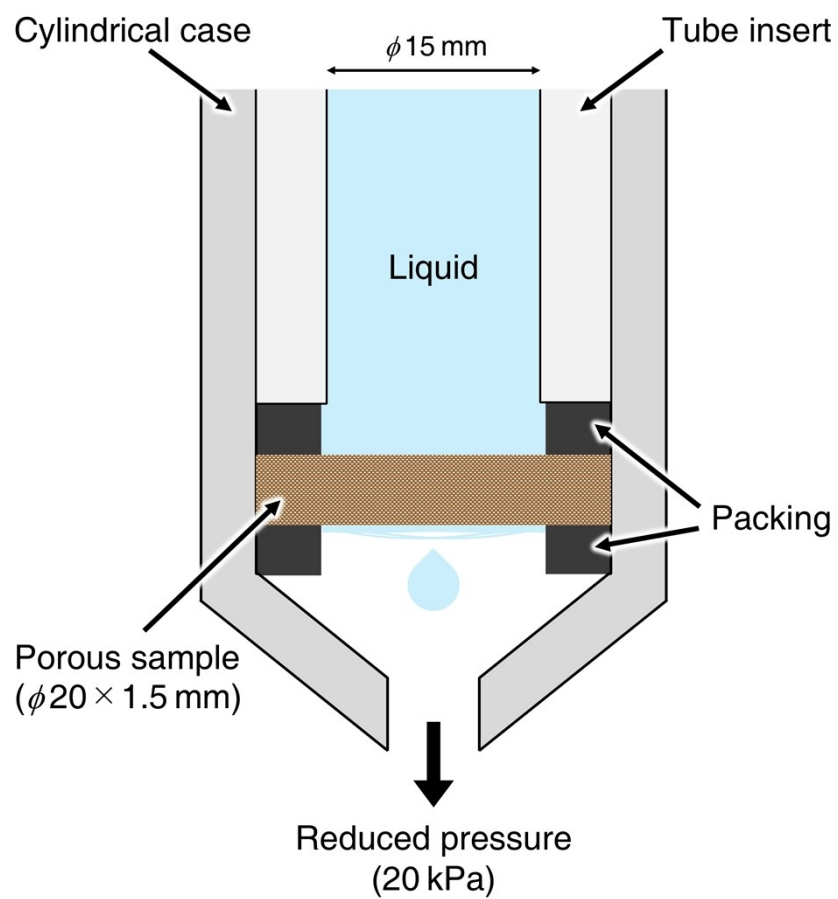


Figure S8. Schematic illustration of the filtration device.

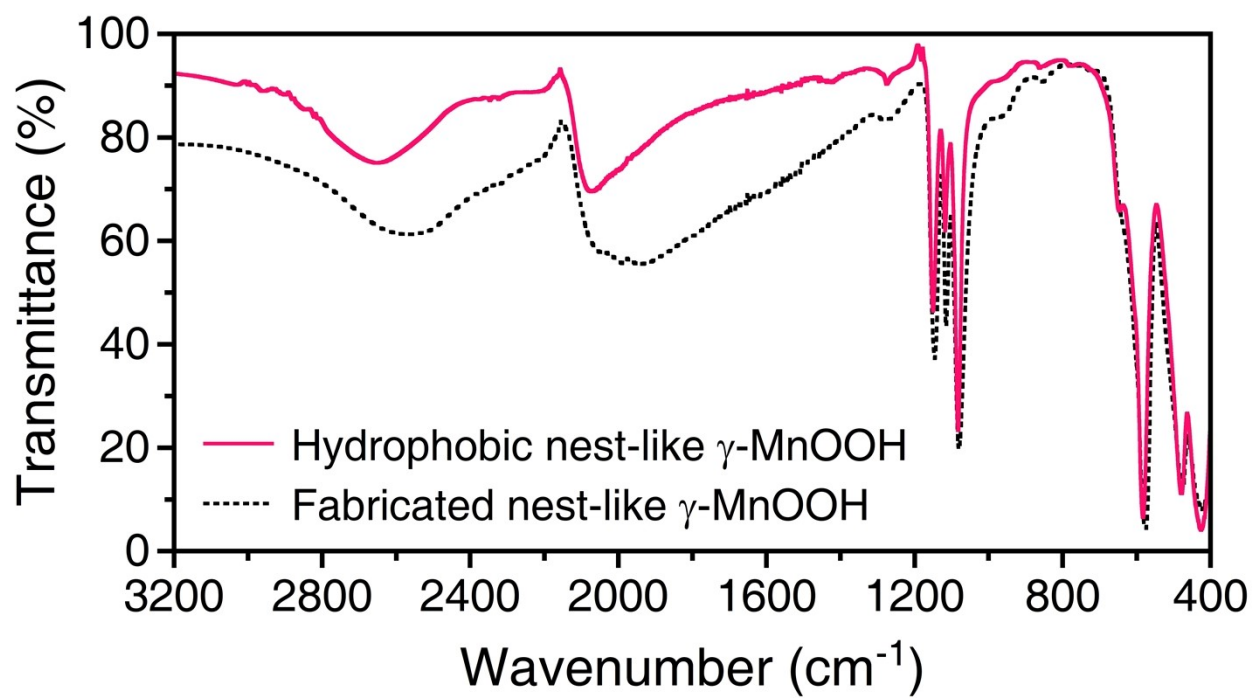


Figure S9. FTIR spectra of nest-like γ -MnOOH before and after surface modification by silanization.

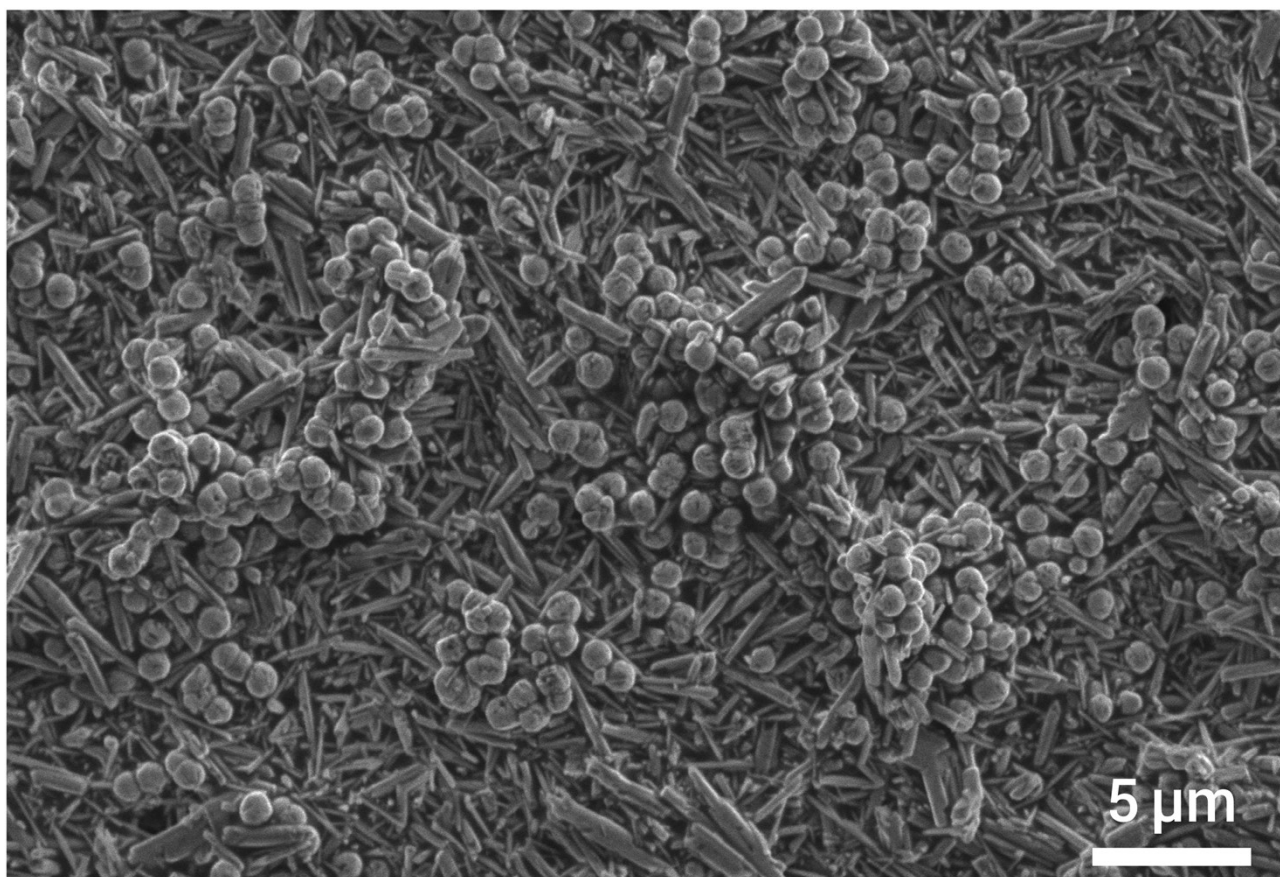


Figure S10. SEM image of the surface of a hydrophobic nest-like γ -MnOOH compact after the three-phase separation experiment; the spherical particles correspond to Fe_3O_4 particles.

Movie 1. 3D internal structure of the nest-like porous γ -MnOOH reconstructed from FIB-SEM images.

Movie 2. Droplet rebounds on hydrophobic nest-like porous γ -MnOOH.