# Supporting Information

## Facile solution synthesis of $Cu_2O$-CuO-$Cu(OH)_2$ hierarchical nanostructures for effective catalytic ozone decomposition

*Shuyan Gong[a,b], Xiaofeng Wu[a], Jilai Zhang[a], Ning Han[a,c,*], Yunfa Chen[a,c,*]*

[a] State Key Laboratory of Multiphase Complex Systems, Institute of Process Engineering, Chinese Academy of Sciences, Beijing 100190, PR China

[b] University of Chinese Academy of Sciences, No. 19A Yuquan Road, Beijing 100049, PR China

[c] Center for Excellence in Regional Atmospheric Environment, Institute of Urban Environment, Chinese Academy of Sciences, Xiamen 361021, PR China

*Corresponding authors:

N. Han, Email: nhan@ipe.ac.cn. Tel.:86-10-62558356, Fax: 86-10-62525716

Y. Chen, Email: chenyf@ipe.ac.cn. Tel.:86-10-82544896, Fax: 86-10-62525716, Post: P.O. Box 353, Beijing 100190, PR China

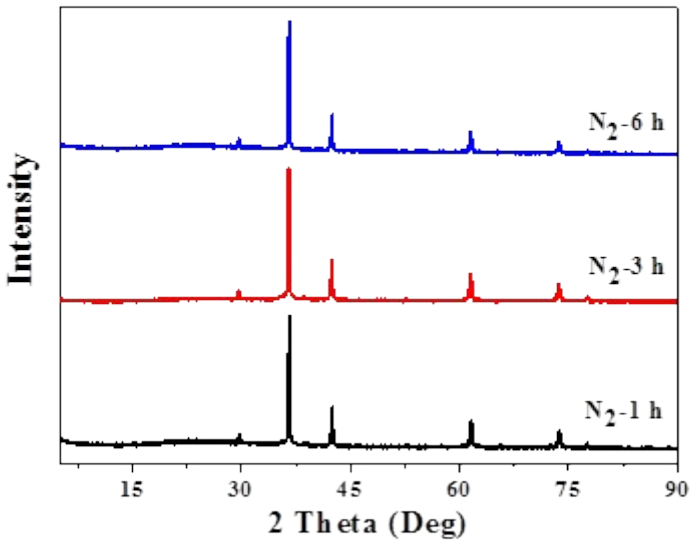


Figure S1 The XRD patterns of samples obtained at different reaction time under $N_2$ atmosphere.

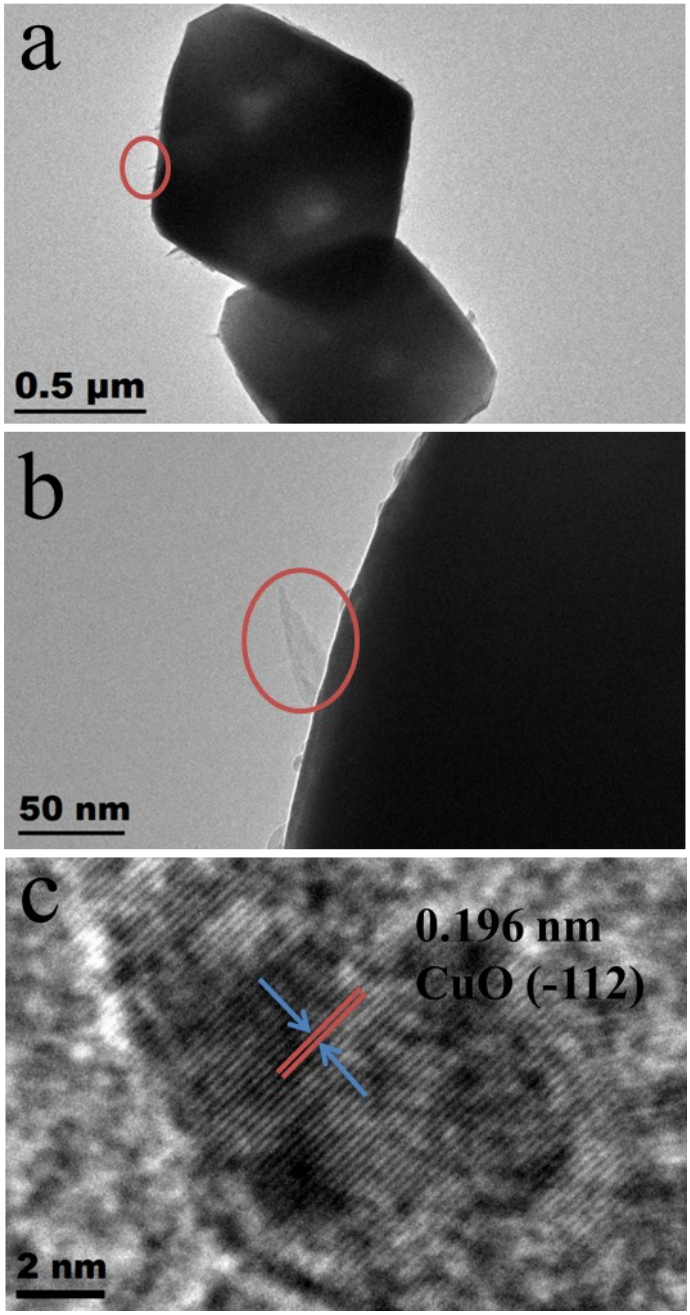


Figure S2 (a-b) TEM and (c) HRTEM of sample obtained at 6 h under $N_2$ atmosphere.

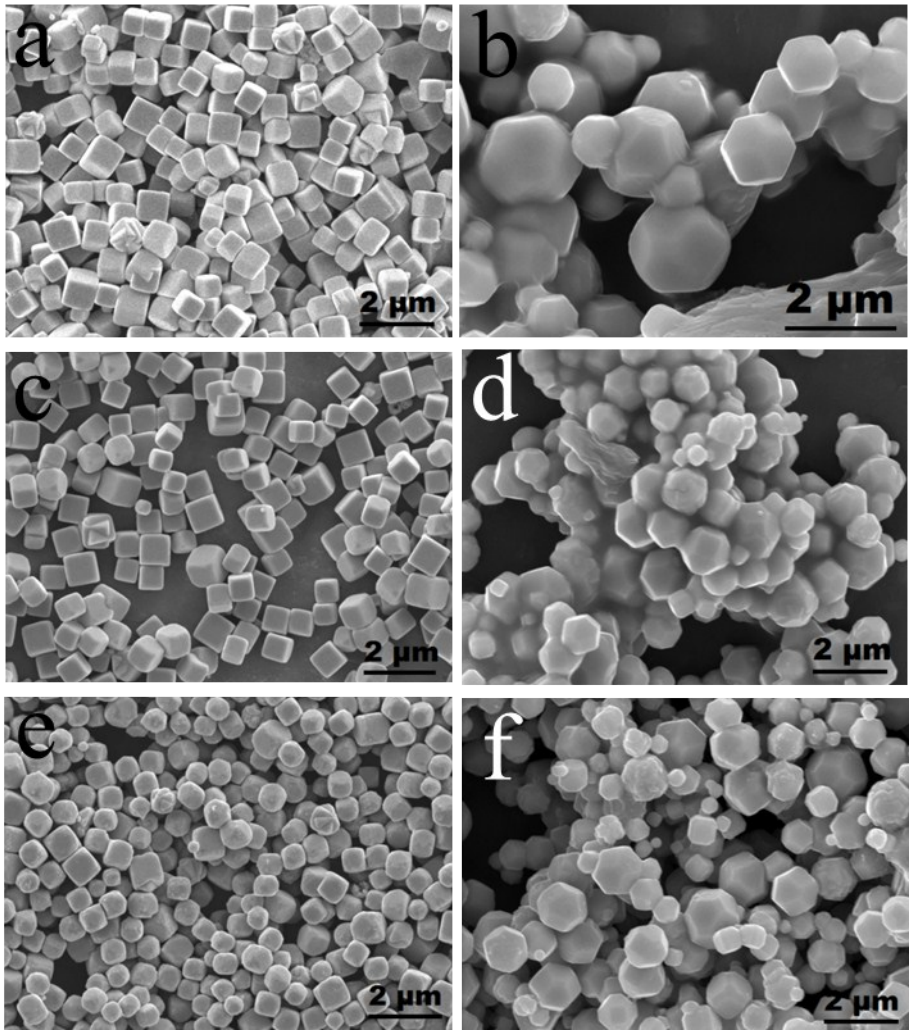


Figure S3 (a,c,e) SEM of samples collected at 1 h, 3 h and 6 h reduced by ascorbic acid (b,d,f) SEM of samples collected at 1 h, 3h and 6 h reduced by glucose.

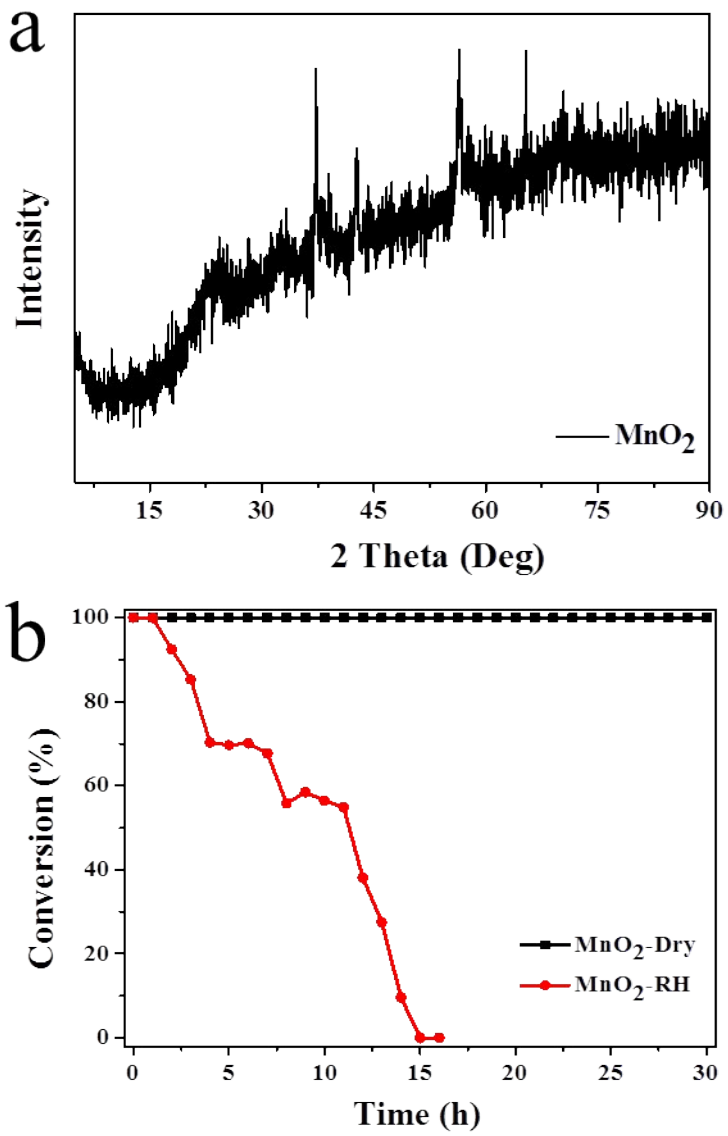


Figure S4 (a) The XRD patterns of referenced $MnO_2$ (b) Ozone catalytic decomposition over referenced $MnO_2$ at room temperature in dry air and at high relative humidity (RH~90%) with an ozone concentration of 20 ppm.

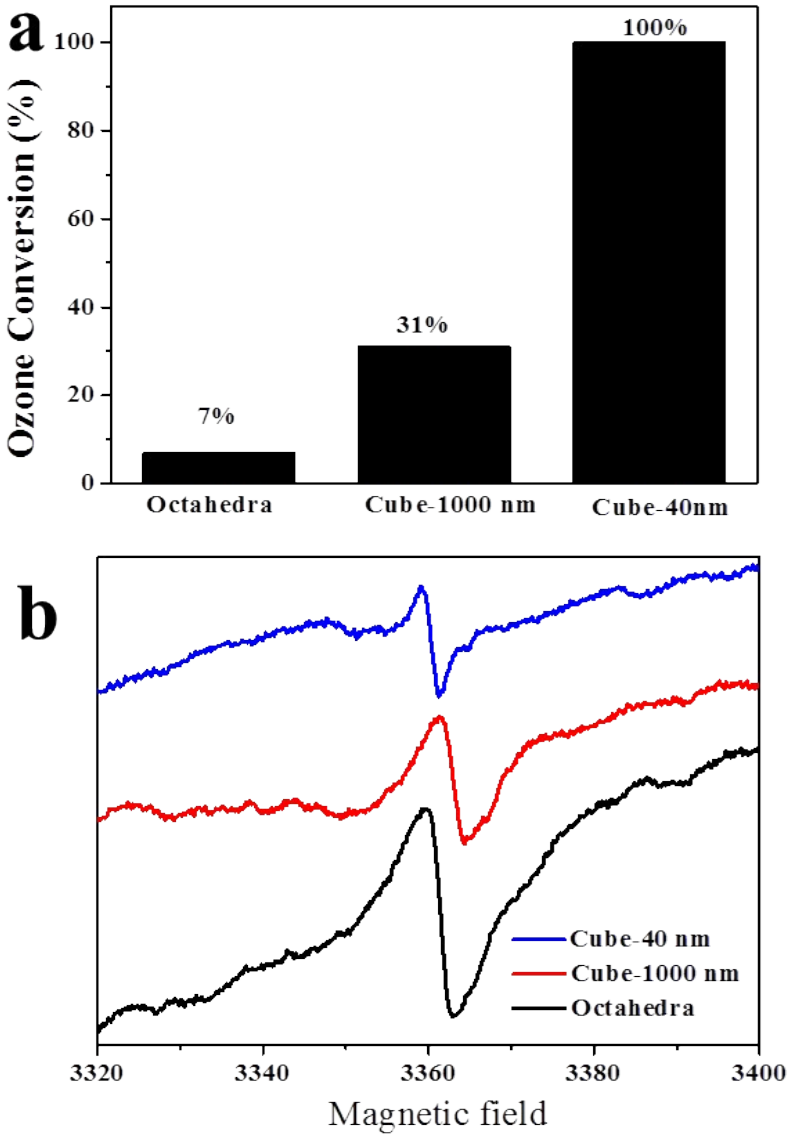


Figure S5 (a) ozone conversion after 2 h test of octahedra, cube-1000 nm and cube-40 nm $Cu_2O$ (Ozone inlet concentration: 20 ppm for octahedra and cube-1000 nm, 200 ppm for cube-40nm, T=25 °C, SV= 60,000 mL $g^{-1}$ $h^{-1}$) (b) EPR spectra of octahedra, cube-1000 nm and cube-40 nm.

Table S1 The specific surface area of S-15 min, S-3 h and S-15 h

| **Sample** | **Surface area ($m^2$/g)** |
|---|---|
| S-15 min | 5.8 |
| S-3 h | 12.3 |
| S-15 h | 25.5 |