

Supplementary Information

Facile synthesis of large area porous Cu₂O as super hydrophobic yellow-red phosphors

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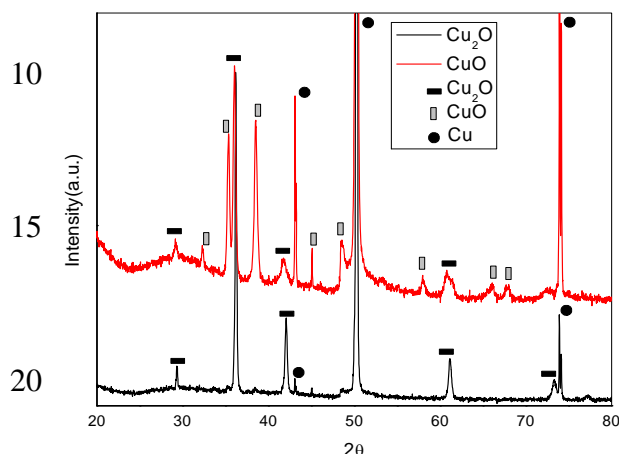


Fig. S1 XRD of CuO and Cu₂O films.

XRD pattern of CuO nanorods film show both CuO and Cu₂O phases are present, majority of peaks are index to monoclinic phase of CuO (JCPDS No. 80-0076) whereas few peak corresponds to Cubic Cu₂O phase. The lattice parameters for monoclinic phase are $a = 4.67 \text{ \AA}$; $b = 3.43 \text{ \AA}$; $c = 5.13 \text{ \AA}$. The XRD pattern of porous Cu₂O film shows only Cu₂O phase and peaks index to cubic phase having lattice parameters are $a = b = c = 4.25 \text{ \AA}$ (JCPDS No. 77-0199).

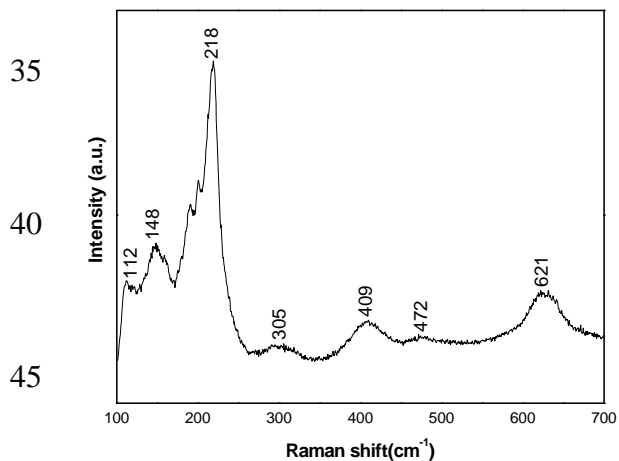


Fig. S2 Raman spectrum of Cu₂O film.

Raman spectrum of Cu₂O film is shown in Figure S2. The most intense Raman signal is observed at 218 cm^{-1} , which is a characteristic peak of Cu₂O. The Raman spectrum also shows the final product obtained on Cu foil after heated in argon environment $600 \text{ }^\circ\text{C}$ for 2 h is Cu₂O.

60

65

70

75

80

85

90

95

100

105

110

115

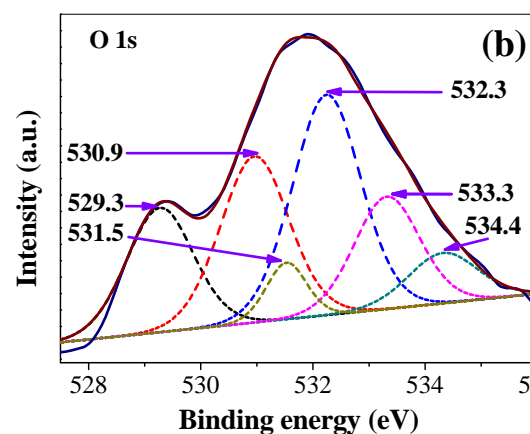
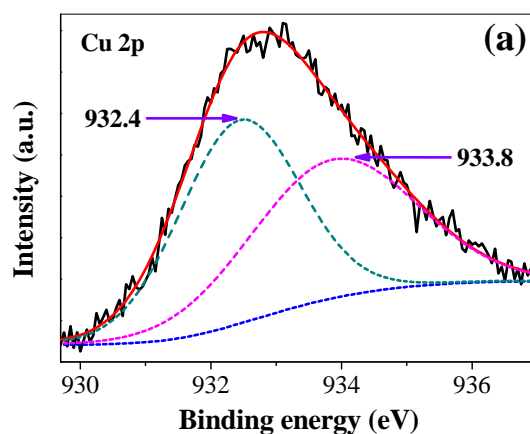


Fig. S3 X-ray photoelectron spectroscopy (XPS) of porous Cu₂O film. (a) Cu 2p peaks, 932.4 eV (Cu₂O), 933.8 eV (Cu₂O). (b) O 1s peaks, 529.3 eV (CuO), 530.9 eV (Cu₂O), 531.5 eV (additional oxygen form on Cu₂O surface because of strong chemisorbed O⁻ species), 532.3 eV (due to -O-H bond on the surface), 533.3 and 534.4 eV (due to adsorb water on surface)

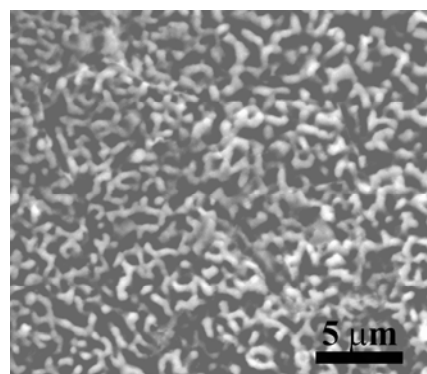


Fig. S4 SEM image of the Cu₂O film prepared at $650 \text{ }^\circ\text{C}$ for 2 h

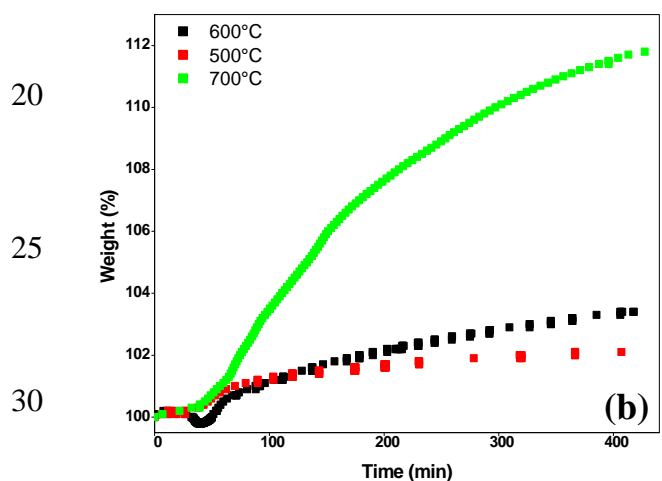
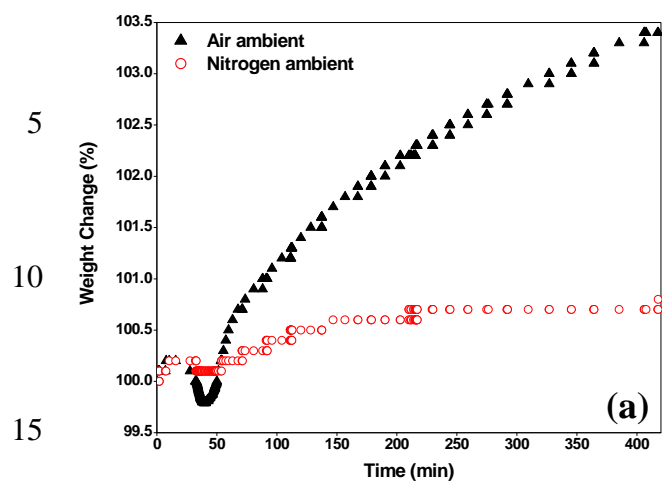


Fig. S5 (a) Oxidation kinetics curves of Cu foil oxidized in air and nitrogen ambient at 600 °C for 6 h and (b) Oxidation kinetics curves of Cu foil oxidized in air ambient at 500, 600 and 700 °C respectively.

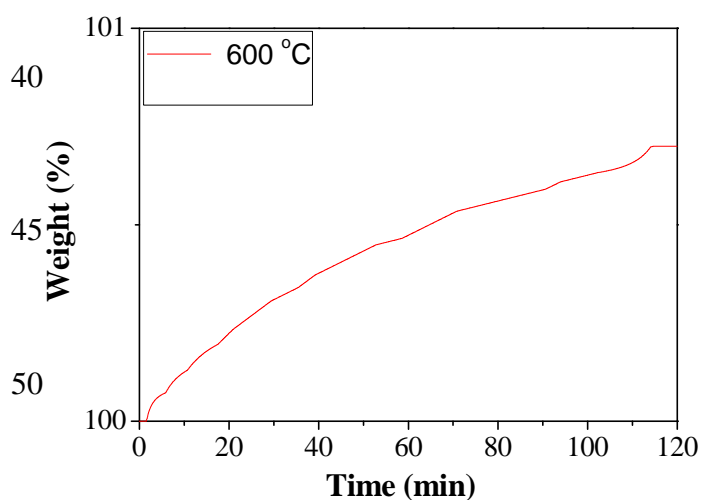


Fig. S6 Oxidation kinetics curves of CuO film in nitrogen ambient at 600 °C for 2 h.

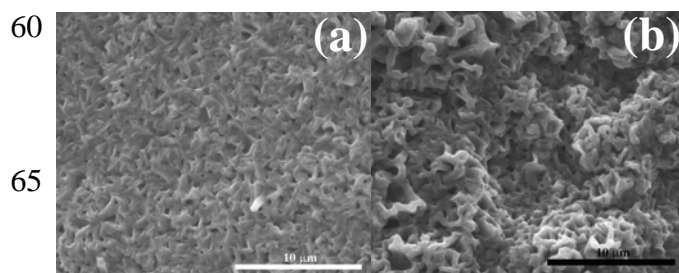


Fig. S7 (a,b) SEM images of the CuO film after TGA experiment in N₂ ambient at 600 °C for 2 h. The initial morphology was CuO nanorods.