Electronic Supporting Information

Material-independent film formation and autonomous degradation of Cu^{2+}-tetrahydroxy-1,4-benzoquinone metal-organic complex

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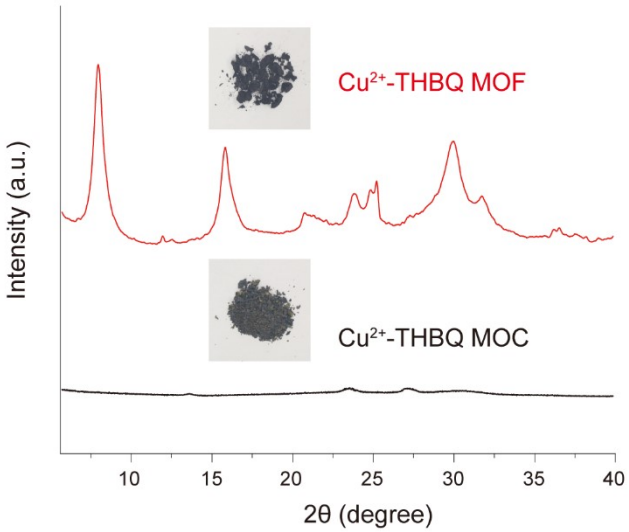

Fig. S1 X-ray diffraction patterns of Cu^{2+}-THBQ MOC and as-synthesized Cu^{2+}-THBQ MOF. Insets are the optical appearances of each metal-oraganic species.

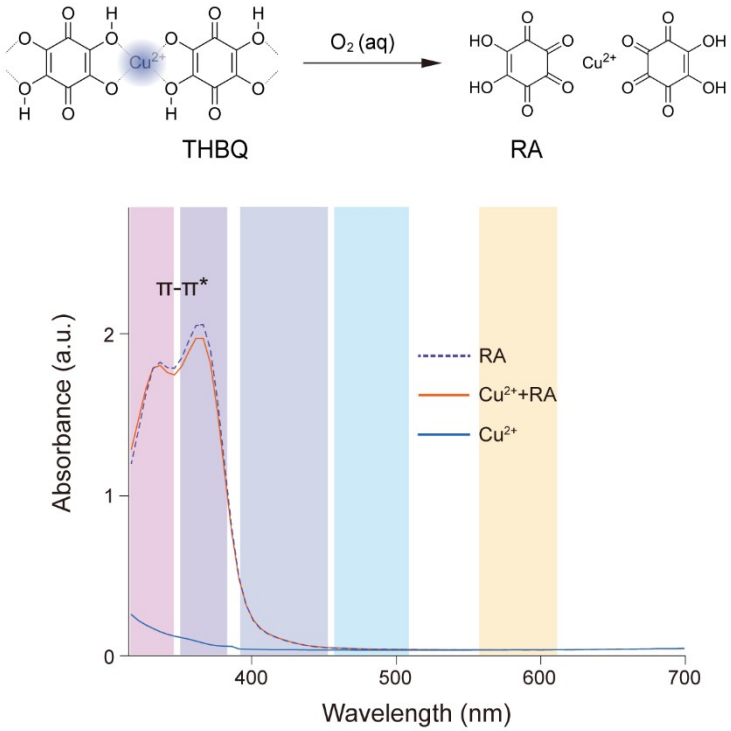

Fig. S2 UV-vis spectra of Cu^{2+}, RA, and Cu^{2+}+RA solutions with the final concentrations of 1 mM. THBQ undergoes aqueous O_2-driven oxidation, which leads to the degradation of Cu^{2+}-THBQ MOC in air.

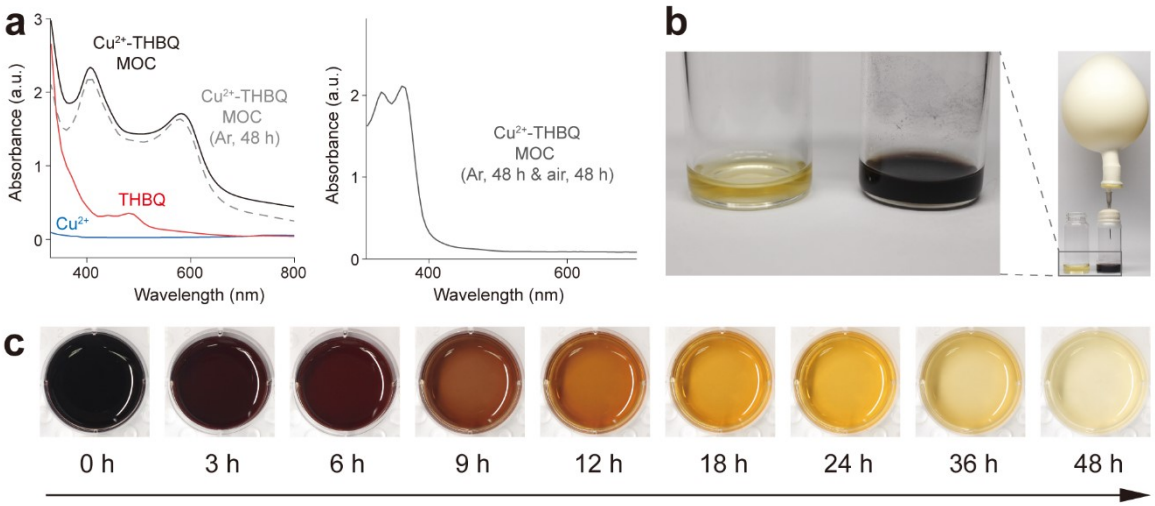

Fig. S3 a) (left) UV-vis spectra of Cu^{2+} (cyan), THBQ (red), and Cu^{2+}-THBQ MOC (black) soltions, and a Cu^{2+}-THBQ MOC solution purged with Ar for 48 h (gray, dotted). (right) UV-vis spectrum of a Cu^{2+}-THBQ MOC solution after purging with Ar for 48 h and subsequent exposure to air for 48 h. b) Optical images of Cu^{2+}-THBQ MOC solutions under open (left) and Ar-purged (right) conditions after 48 h. c) Optical images of Cu^{2+}-THBQ MOC solutions exposed to air after the predetermined time.

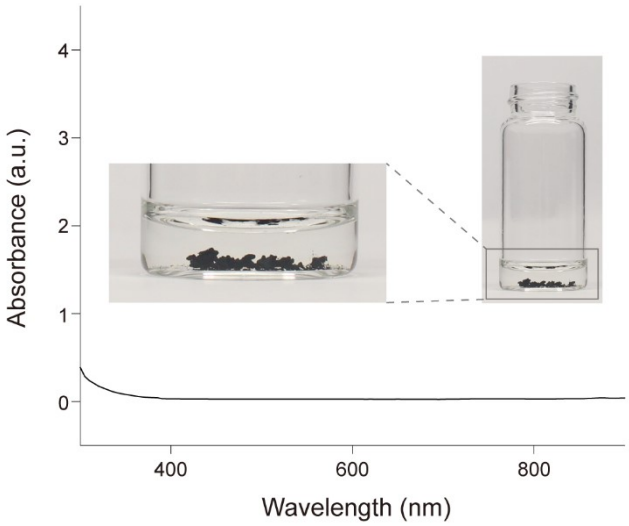

Fig. S4 Optical images of a Cu^{2+}-THBQ MOF suspension after 48 h of incubation in air and UV-vis spectrum of its supernatant.

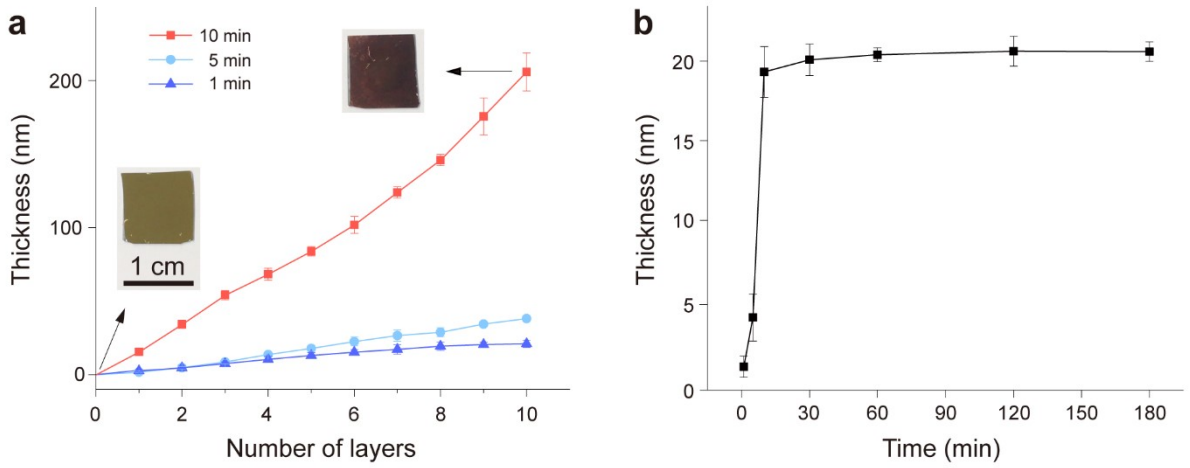

Fig. S5 a) Film thickness of Cu^{2+}-THBQ MOC films on gold substrates with respect to the number of film layers. Incubation time varies from 1 to 10 min. Insets are the optical images of a bare gold substrate and a gold substrate coated with 10 layers of Cu^{2+}-THBQ MOC films. Scale bar: 1 cm. b) Film thickness of Cu^{2+}-THBQ MOC films on gold substrates with respect to incubation time.

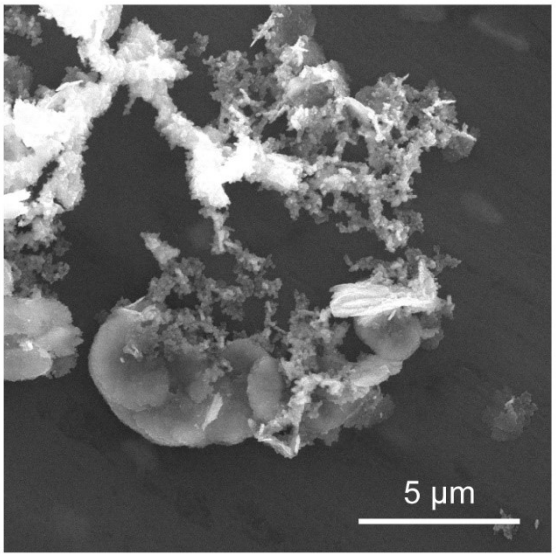

Fig. S6 FE-SEM image of Cu^{2+}-HHB MOC on a gold substrate.

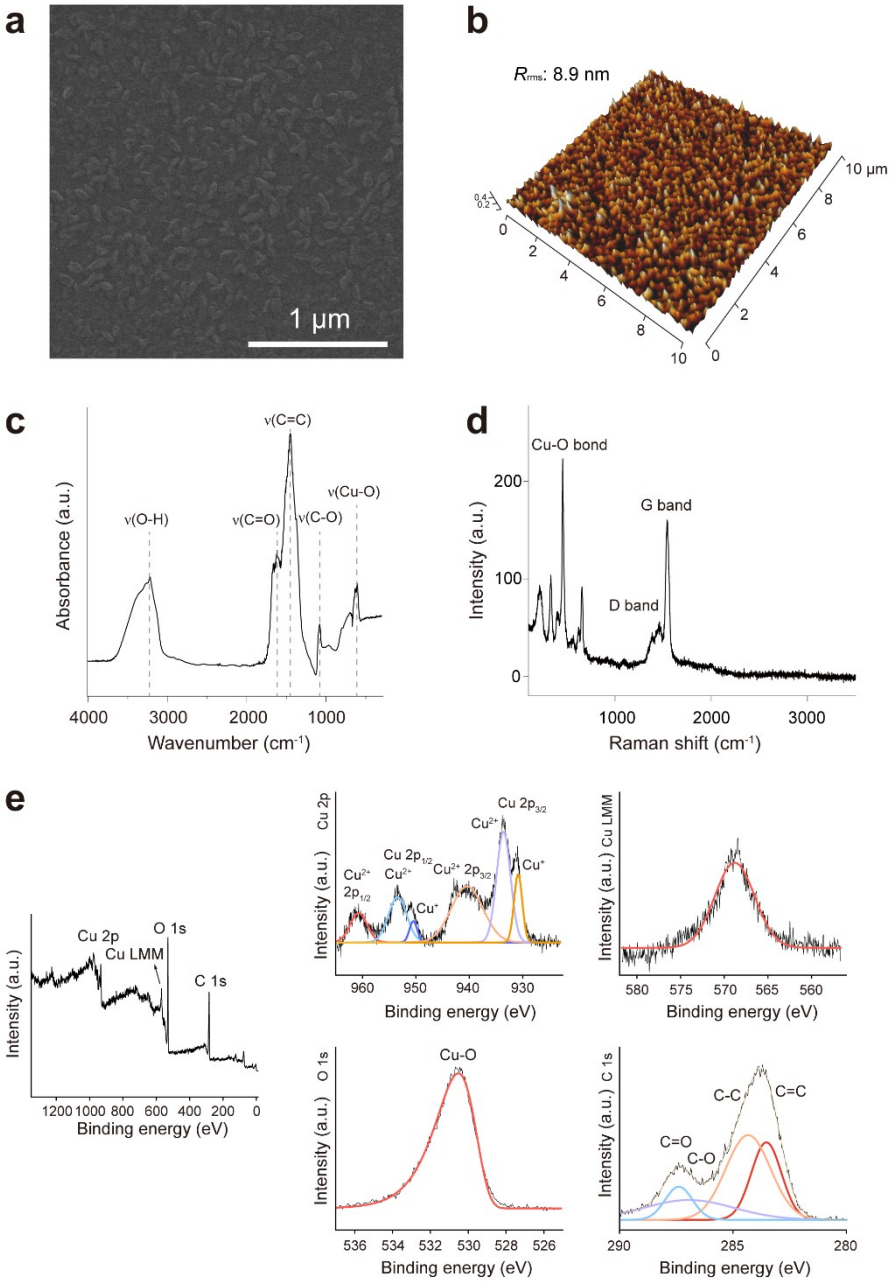

Fig. S7 a) FE-SEM and b) AFM images, and c) FT-IR, d) Raman, and e) XPS spectra of $[Cu^{2+}\text{-THBQ}]_{10}$ films on gold substrates.

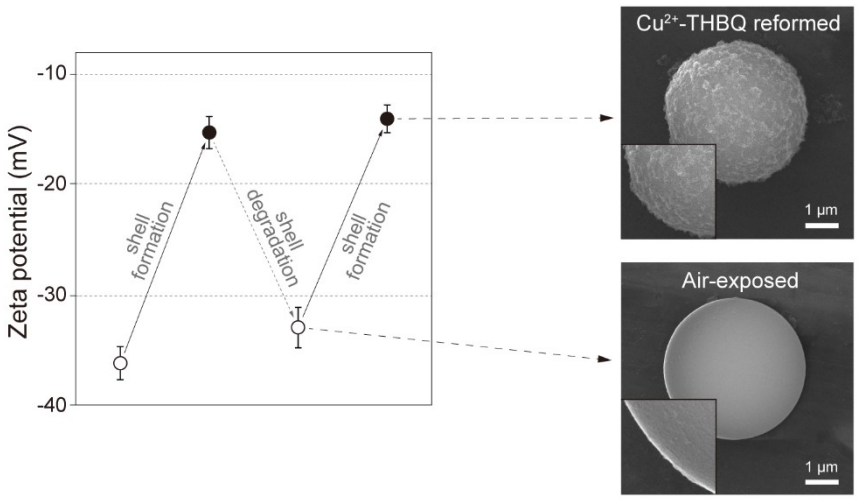

Fig. S8 Changes in zeta potential and FE-SEM images of PS particles after repetitive shell formation and degradation.

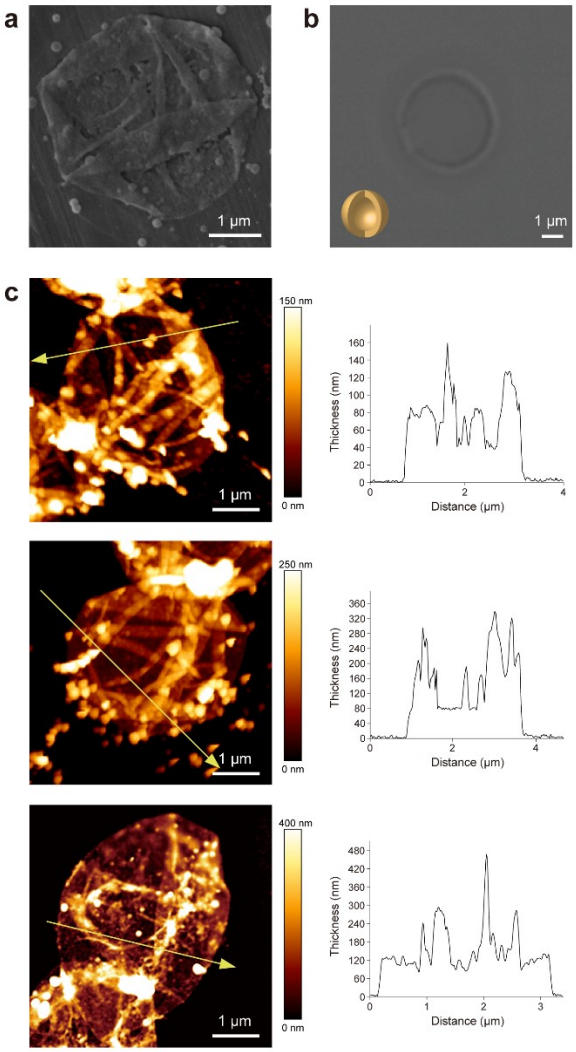

Fig. S9 a) FE-SEM and b) CLSM images of a hollow Cu^{2+}-THBQ MOC capsule. c) AFM images and line-scan thickness profiles of hollow Cu^{2+}-THBQ MOC capsules with 1, 2, and 3 depositions (from top to bottom).