

As the amount of CMCH increases, the erosion of the apex corners of Cu_2O gradually disappears. The depth of erosion of the $\{111\}$ crystal plane also gradually decreases with increasing CMCH, as shown in Fig.S1a–d. CMCH is not only adsorbed on the $\{111\}$ plane of the Cu_2O octahedrons but is also absorbed on the corners and edges of the Cu_2O crystals. The gradient of the Cu^+ concentration at the edges and corners of the crystal decreases, leading to better protection of the corners and transformation of the product, which has serious erosion at the apex corners, from octa-pods into complete octahedrons.

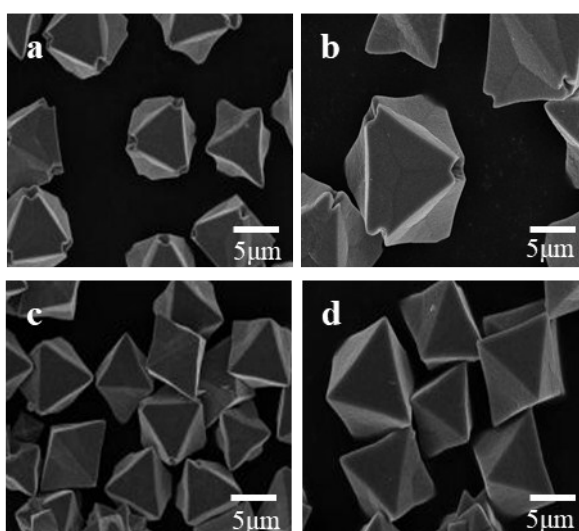


Fig. S1 SEM images of Cu_2O micron / nanocrystals synthesized with different CMCH concentrations (g/250ml): a. 0.9; b. 1.5; c. 1.9; d. 2.2.