Supplementary information for

Alkaloid-induced asymmetric hydrogenation on bimetallic Pt@Cu cathodes by electrochemical conditions

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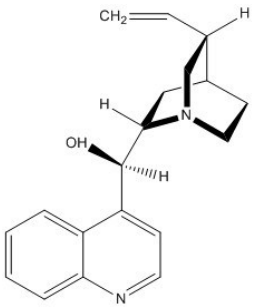
1. Structure of cinchonidine (CD)



Scheme S1

2. Definition of enantiomeric excesses (ee)

$$ee = \frac{[R]-[S]}{[R]+[S]} \times 100 \qquad \textbf{Eq. S1}$$

3. Characterization of Cu NPs

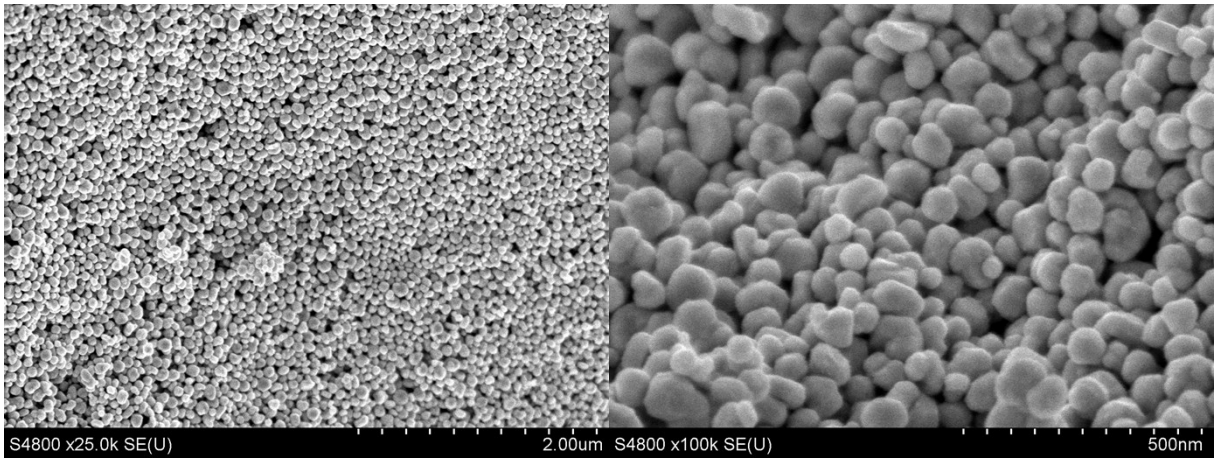


Fig. S1 SEM patterns of Cu NPs with different magnification, (A) (25K), (B) (100K).

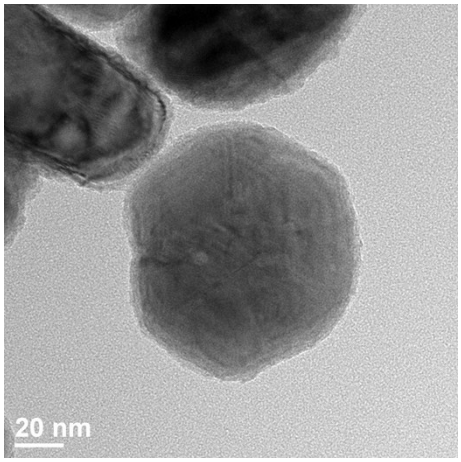


Fig. S2 Low magnification TEM image of pure Cu NPs

4. Characterization of specific surface area

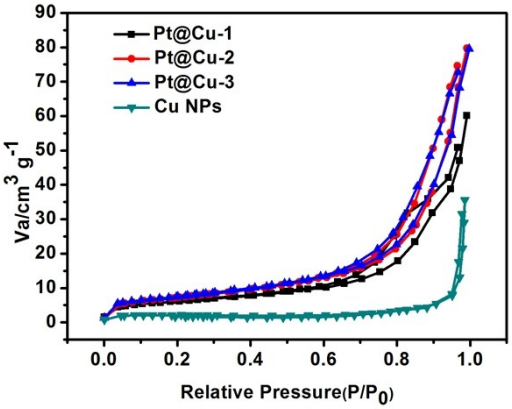


Fig. S3 Nitrogen adsorption-desorption isotherm of Pt@Cu-1 NPs, Pt@Cu-2 NPs, Pt@Cu-3 NPs and pure Cu NPs

Table S1 Specific surface area of different bimetal samples

Sample	Specific surface area (m^2 g^{-1})
Pt@Cu-1 NPs	39.3
Pt@Cu-2 NPs	40.6
Pt@Cu-3 NPs	40.0
Cu NPs	6.0

5. Characterization of Pt@ Cu-2 NPs after using

According to SEM patterns (Fig. S4), Pt@Cu-2 NPs preserved its particle morphology after using six times, only a little part of particles agglomerated into larger ones, most bimetal nanoparticles could remain its particle size. The TEM images (Fig. S5) did not show phase separation between Pt NPs and Cu NPs.

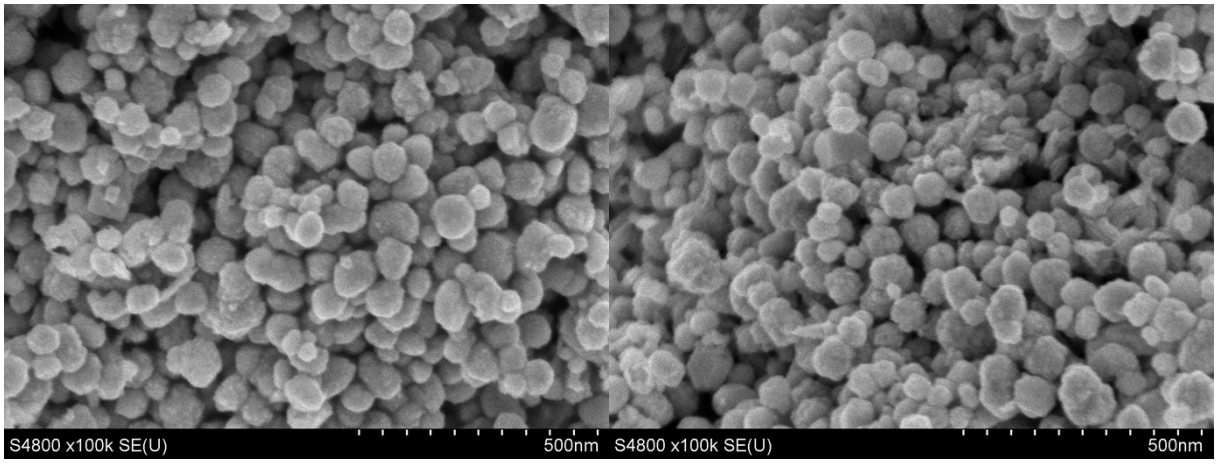


Fig. S4 SEM patterns of Pt@Cu-2 NPs before using (left) and after using for six times (right).

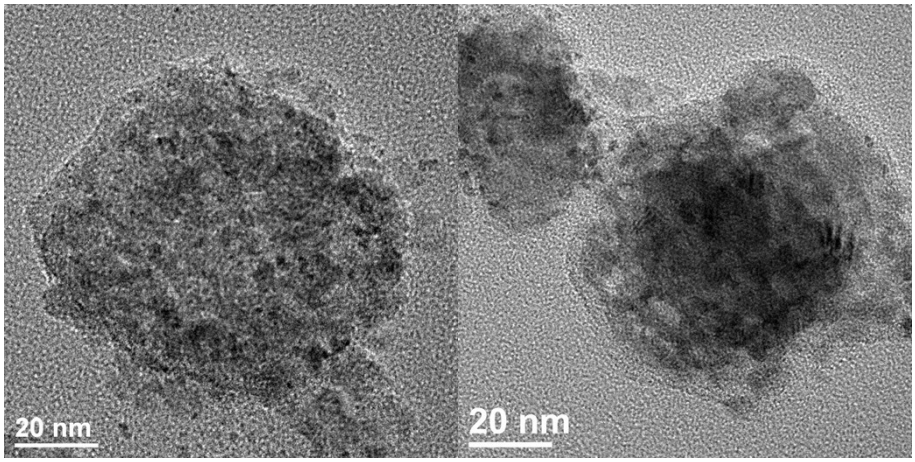


Fig. S5 Low magnification TEM image of Pt@Cu-2 NPs before using (left) and after using for six times (right).