

## Model of Cu\_cav@C reactor

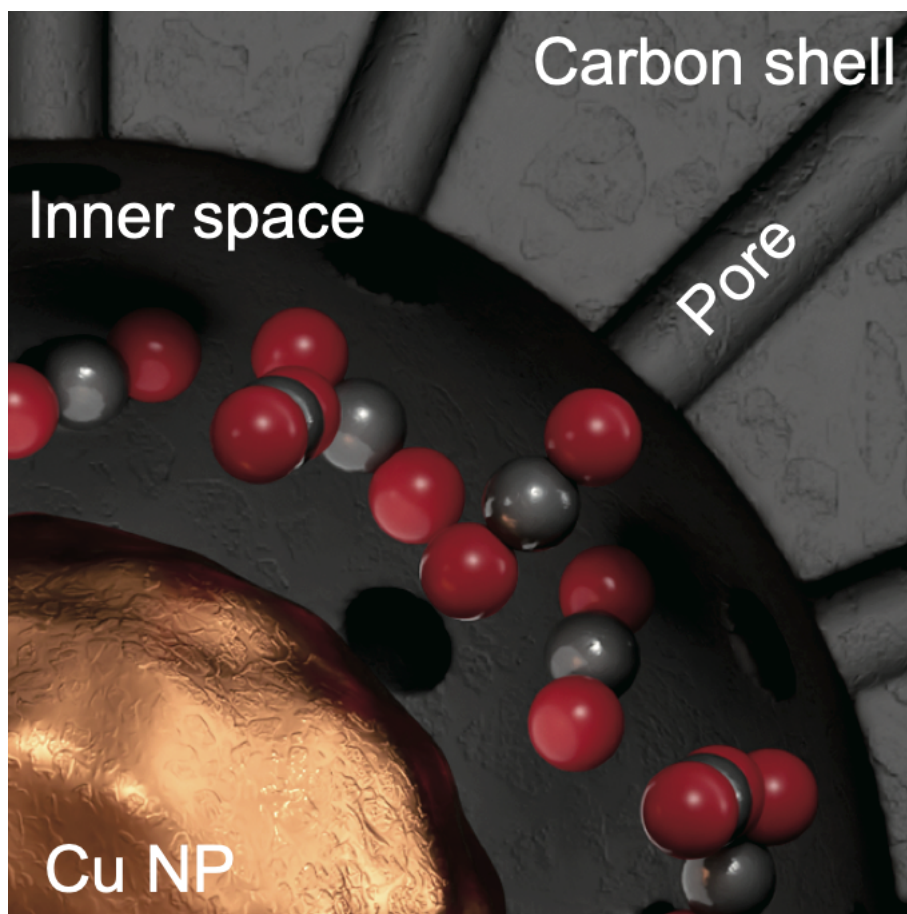


Figure 1: Structure

- Structure: Cu nanoparticle core wrapped by porous carbon layer shell, with cavities in the carbon layer shell;
- particle size of the Cu nanoparticle: 35 nm
- distance between the Cu nanoparticle and porous carbon layer:  $8.22 \pm 1.85$  nm
- the HAADF-STEM images confirmed the crystalline nature of the copper cores, with evident twinning, as exemplified by a representative five-fold twinned structure.

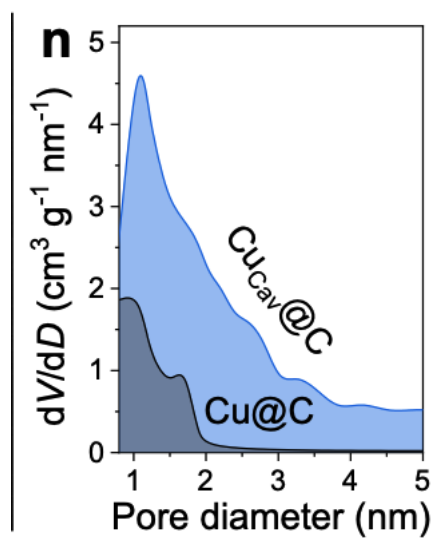


Figure 2: pore diameter