Review of elemental mercury (Hg^0) removal by CuO-based materials

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Fundamentals of CuO

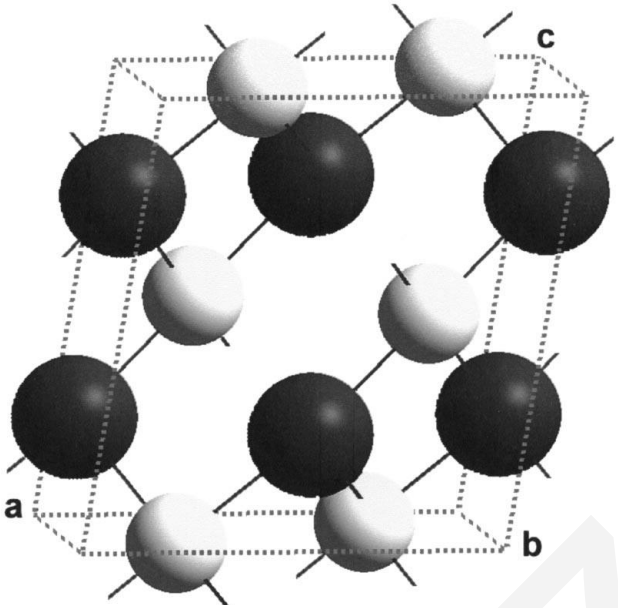
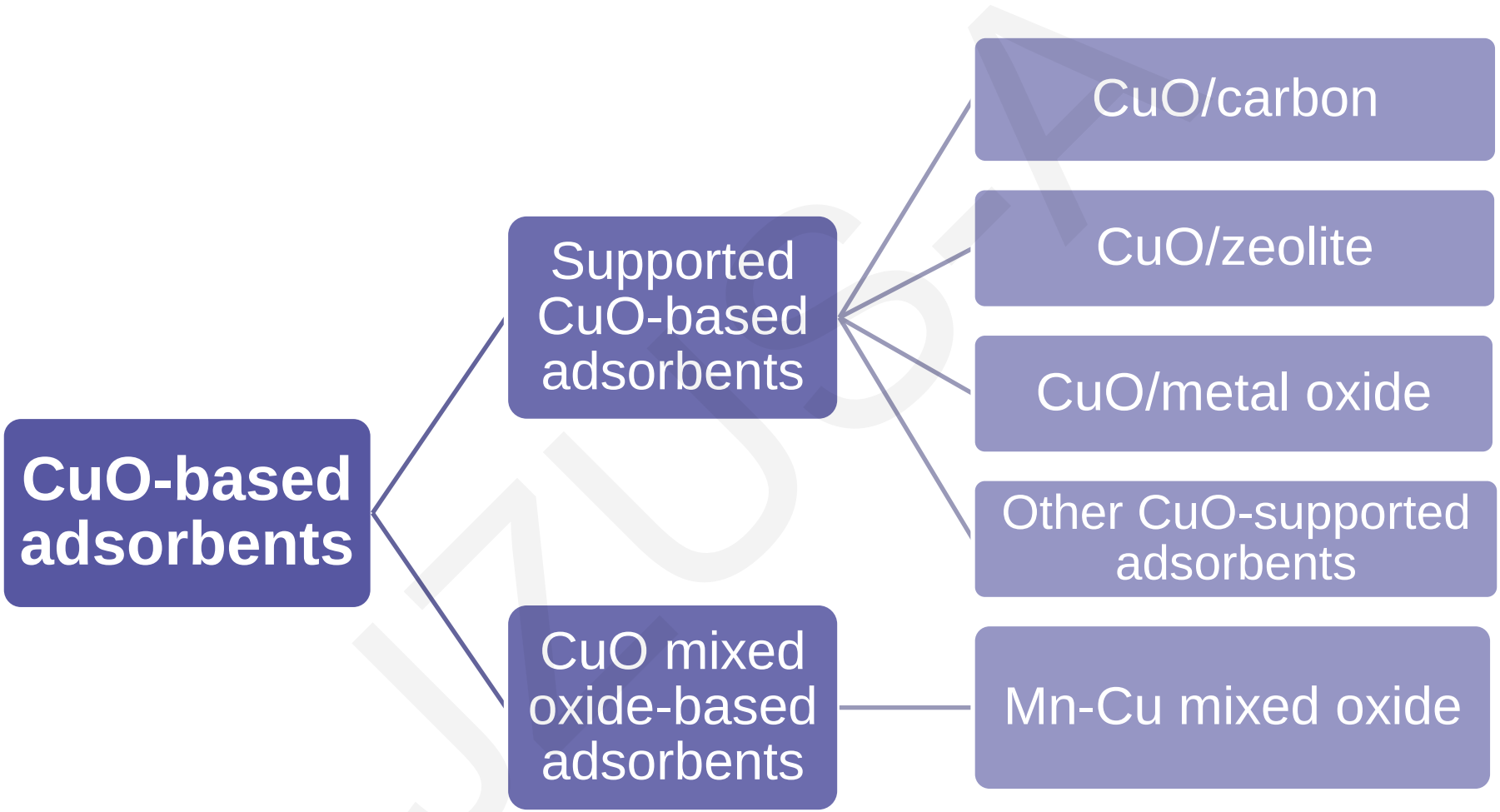


Fig. 1 Model of a CuO unit; white and black spheres represent O and Cu atoms, respectively

Preparation of CuO

- Solution-based
- Solid-state
- Electrochemical

Hg^0 removal performance



Simultaneous removal of multiple pollutants

- Simultaneous removal of Hg^0 and NO_x
- Simultaneous removal of Hg^0 and CO
- Simultaneous removal of Hg^0 and HCHO

Perspectivea

- At pilot-scale and full-scale, there is still some doubt as to whether Hg^0 and other air pollutants can be thoroughly abated. The competitive adsorption mechanisms of multiple air pollutants onto the adsorbent surface active sites still needed to be explored.
- Apart from SO_2, NO, H_2O, NH_3, and HCl, there are other species in real coal-fired flue gas, such as arsenic, phosphorus, and lead compounds. The effects of these species on the adsorbent Hg^0 capture performance also needs investigation. Provided these species would deactivate the adsorbents, the related anti-poisoning and regeneration techniques should also developed to achieve the goal of the effective reduction of mercury emissions.