



## Extraction of copper in a contaminated soil onto chabazite

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Copper in a contaminated soil nearby a printed-circuit board waste recycling plant has been extracted onto a micro-porous molecular sieve (chabazite). The chabazite supported CuO can be used as a chemical looping combustion (CLC) oxygen carrier for CO<sub>2</sub> capture. Speciation of copper in the contaminated soil and on the chabazite during CLC has been studied by X-ray absorption near edge structure (XANES) and X-ray absorption fine structure (EXAFS) spectroscopy. By XANES, it is found that about 90% of copper (mainly Cu<sup>2+</sup>) in the contaminated soil can be extracted and adsorbed on the chabazite, in which CuO can be formed on the chabazite after calcination at 773 K for two hours. The EXAFS data show that copper in the soil and chabazite possesses Cu-O bond distances of 1.96 and 1.95 Å, respectively and coordination numbers (CNs) of 1-3. After CLC, CuO on chabazite has been reduced to Cu with a C-C bond distance of 2.4 Å and a CN of 8. This work also exemplifies the utilization of EXAFS and XANES to reveal the migration path of copper between a contaminated soil and a molecular sieve and interconversion of Cu-CuO in the CLC process.