

Preparation of copper(I)-loaded adsorbents with antioxidants for CO separation

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CO is largely produced in steel making processes as off-gases (coke oven gas, blast furnace gas, Linz-Donawitz gas). It is typical that CO is burned to recover energy but a greenhouse gas, CO₂ is inevitably produced. If CO is efficiently recovered from the off-gases, it could be used for the production of more valuable chemicals such as acetic acid, polycarbonate, phosgene, isocyanates, and various specialty chemicals. So far, cryogenic distillation and absorption have been used for the separation of CO. However, distillation is energetically disadvantageous and absorption has an environmental issue. Gas adsorptive separation such as pressure swing adsorption process is more suitable for the medium-scale production and has a relative simplicity in operation. It has been reported that copper(I)-loaded adsorbents are used for CO-selective adsorption. But copper(I) can be easily oxidized to copper(II) by oxygen or in humid atmosphere. In this study, the preparation method of the CO-selective copper(I)-loaded adsorbents with antioxidants was investigated in order to maintain the oxidation state of copper(I).