燃料化学学报
JOURNAL OF FUEL CHEMISTRY AND TECHNOLOGY
ISSN 0253-2409
CN 14-1140/TQ



燃料化学学报 » 2013, Vol. 41 » Issue (11): 1371-1377　DOI:



# 纳米氧化锌在模拟煤气下吸附单质汞的实验研究

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# Elemental mercury removal from syngas by nano-ZnO sorbent

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全文: PDF (1494 KB)　HTML (1 KB)　输出: BibTeX | EndNote (RIS)　背景资料

摘要 采用均匀沉淀法制备纳米氧化锌吸附剂,并采用BET、XRD、XPS等分析手段对其进行表征。在固定床吸附实验台上,研究了吸附剂在$N_2$和模拟煤气气氛下对单质汞的吸附特性,分析气体成分对纳米氧化锌脱汞性能的影响。结果表明,纳米氧化锌在纯$N_2$气氛下的脱汞效率较低,以物理吸附为主;$H_2S$的加入可以显著提高纳米氧化锌对汞的吸附,停止通入$H_2S$后,脱汞效率仍能维持较长时间;CO和$H_2$通过促进纳米氧化锌脱硫进而促进对汞的脱除。随着温度的提高,纳米氧化锌表面形成的单质硫逐渐减少,抑制了吸附剂对单质汞的吸附脱除。

关键词: 汞　纳米氧化锌　脱汞效率　煤气气氛

Abstract: Nano-ZnO sorbents synthesized by a homogeneous precipitation method were characterized by BET (Brunauer-Emmett-Teller), XRD (X-ray diffraction) as well as XPS (X-ray photoelectron spectroscopy) analysis. The adsorption of elemental mercury by nano-ZnO under nitrogen and simulated gas atmosphere was studied on a bench-scale fixed-bed apparatus. The effect of various gases on $Hg^0$ removal performance by nano-ZnO was analyzed. The results show that the mercury removal efficiency of the nano-ZnO is relatively poor in nitrogen atmosphere. The presence of $H_2S$ promotes the $Hg^0$ removal by nano-ZnO observably and the mercury removal efficiency can be maintained for a long time even after stopping pass into $H_2S$. The presence of CO and $H_2$ promotes the $Hg^0$ removal because of desulfurization effect of nano-ZnO. As the temperature increases, the formation of elemental sulfur in the surface of the nano-ZnO decreases, which can suppress the removal of $Hg^0$ by sorbent.

Key words: elemental mercury　nano-ZnO　removal efficiency　gas atmosphere

收稿日期: 2013-07-10;

基金资助:

国家自然科学基金(51176171)。

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引用本文:

周劲松,齐攀,侯文慧等. 纳米氧化锌在模拟煤气下吸附单质汞的实验研究[J]. 燃料化学学报, 2013, 41(11): 1371-1377.

ZHOU Jin-song,QI Pan,HOU Wen-hui et al. Elemental mercury removal from syngas by nano-ZnO sorbent[J]. J Fuel Chem Technol, 2013, 41(11): 1371-1377.

链接本文:

http://rlhxxb.sxicc.ac.cn/CN/　或　http://rlhxxb.sxicc.ac.cn/CN/Y2013/V41/I11/1371

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