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Ni对Cu/ZnO基甲醇裂解催化剂的促进机制

席靖宇,王卫平,吕功煊

中国科学院兰州化学物理研究所,兰州(730000)

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摘要 通过XRD，BET，In-situ XPS等表征技术对Cu/ZnO基甲醇裂解制氢催化剂进行了详细的研究。XRD结果表明，Cu-Zn合金的生成是Cu/ZnO基催化剂在反应初期快速 失活的主要原因；XRD，BET和N_2O滴定实验结果表明，Ni助剂可能是通过提高 Cu~0活性物种的分散度并维持Cu~0活性物种在催化反应过程中的稳定性而使 Cu/Zn/Ni催化剂的活性及稳定性大幅度提高。In-situ XPS结果表明，Ni助剂的加 入可以诱导Cu/Zn/Ni催化剂表面在甲醇裂解反应过程中出现Cu~+，从而由Cu~0/Cu~+共同构成催化剂的活性中心，并最终导致Cu/Zn/Ni催化剂的高活性。

关键词 镍 铜 氧化锌 甲醇 裂解 氢 催化活性 X射线衍射分析

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Mechanism of Cu/ZnO Based Catalysis for Methanol Decomposition Promoted by Nickel

Xi Jingyu,Wang Weiping,Lu Gongxuan

State Key Laboratory for Oxo Synthesis and Selective Oxidation, Lanzhou Institute of Chemical Physics, Chinese Academy of Sciences, Lanzhou(730000)

Abstract XRD, BET and In-situ XPS techniques were used to study the performance of Cu/ZnO based catalysts for methanol decomposition. XRD studies indicated that the formation of Cu-Zn alloys was the major reason for the quickly deactivation of Cu/Zn catalyst for methanol decomposition at the initial stage of the reaction. XRD, BET and N_2O titration results confirmed that nickel additive could increase the dispersity of active Cu~0 species during the catalytic process and maintain the stability during the reaction. In-situ XPS studies confirmed that the active center in Cu/Zn/Ni catalyst was Cu~0 and/or Cu~+ species, in which Cu`+ was formed during the reaction.

Key words NICKEL COPPER ZINC OXIDE METHANOL PYROLYSIS HYDROGEN CATALYTIC ACTIVITY XRD

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通讯作者