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H_2O对$Cu^+/S_2O_8^{2-}/\gamma$-Al_2O_3催化剂合成碳酸二甲酯性能的影响

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Effects of water on catalytic performance of $Cu^+/S_2O_8^{2-}/\gamma$-Al_2O_3 for oxidative carbonylation of methanol to dimethyl carbonate

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摘要 反应温度120℃、压力3.0 MPa的条件下,考察了H_2O对浆态床DMC合成催化剂$Cu^+/S_2O_8^{2-}/\gamma$-Al_2O_3活性的影响。结果表明,外界H_2O的引入加剧了催化剂的失活速率。对引入H_2O后回收催化剂进行了元素分析、XRD、DTG、Py-FT-IR和NH_3-TPD等表征,结果表明,H_2O的引入加速了催化剂中活性组分Cu的流失速率,生成更多没有催化甲醇氧化羰基化活性的$Cu_2(OH)_3Cl$晶体,加剧了催化剂的失活。

关键词: 失活 $Cu^+/S_2O_8^{2-}$/&gamma -Al_2O_3 浆态床 DMC

Abstract: Effects of H_2O on the catalyst $Cu^+/S_2O_8^{2-}/\gamma$-Al_2O_3 of DMC synthesis in slurry reactor were investigated under the conditions of 120℃ and 3.0 MPa. The results showed that the introduction of water into reaction system led to quick catalyst deactivation. The catalysts were characterized by the Elemental Analysis, XRD, DTG, Py-FT-IR and NH_3-TPD. The results showed that active component Cu and CuCl, loading on the surface of $S_2O_8^{2-}/\gamma$-Al_2O_3 support, reacted with O_2 and H_2O, then formed $Cu_2(OH)_3Cl$ which was essentially inactive for oxidative carbonylation of methanol to dimethyl carbonate. The catalyst deactivation rate speeded up with increasing water injection.

Key words: deactivation $Cu^+/S_2O_8^{2-}$/&gamma -Al_2O_3 slurry DMC

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