

担载型过渡金属催化剂上甲烷同系聚合反应的研究

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摘要 本文利用瞬变应答反应技术较系统地考察了担载型过渡金属催化剂上甲烷同系聚合制C2以上烃的反应,研究发现通过采用总反应分解法操作,可以克服甲烷同系聚合反应的热力学限制,使该反应能在较为温和的条件下得以进行。本文还系统地探讨了影响该反应的各种因素。523K 5wt% Pt/SiO₂上甲烷的最佳转化可达9.91%。Pt, Co催化剂表现出较为优越的催化性能。甲烷在催化剂表面分解产生的CH_x(ad) (0<=x<=3)物种可能是该反应的活性中间体。

关键词 [金属催化剂](#) [甲烷](#) [聚合](#) [催化性能](#)

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Studies of homologation of methane on supported transition metal catalysts

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Abstract The homologation of methane on supported transition metal catalysts was investigated by using the transient response characterization (TRC). The different factors which greatly affected the reaction were also extensively studied. An important approach is to split the overall reaction into two reaction steps occurring under moderate conditions. In such a two-step route the thermodynamic limitations can be overcome and the homologation of methane may be practically achieved. The optimum conversion of methane on 5wt% Pt/SiO₂ catalyst in the homologation of methane is 9.91% reached at 523K. Of interest is that this reaction might be performed at the same temperature. Platinum and cobalt catalysts favor the homologation of methane. The product distribution and the features of this reaction depend sensitively on the nature of transition metals and the different parameters. This approach might provide an alternative route for the extensive utilization of natural gas. Carbodic and carbonaceous species formed by the decomposition of methane on metal surface may be active intermediates which are responsible for the lengthening of carbon-carbon chain on catalyst surface.

Key words [METAL CATALYST](#) [METHANE](#) [POLYMERIZATION](#) [CATALYTIC BEHAVIOUR](#)

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