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催化、动力学与反应器

Co对非晶态催化剂Ni-Mo-B加氢脱氧性能的影响

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摘要

以$NaBH_4$作为还原剂，采用化学还原法制备出Ni-Mo-B或含助剂Co的Ni-Mo-B非晶态催化剂，用BET、SEM、XRD、XPS和DSC对催化剂进行表征分析，以苯酚为模型化合物研究其加氢脱氧性能。结果表明，所制备的催化剂为非晶态结构，助剂Co的加入，使催化剂粒径变小，促进Ni和B之间的电子转移，提高热稳定性。在苯酚的加氢脱氧活性研究中，加入助剂Co后，Ni-Mo-B显示出高加氢脱氧活性。在523 K、氢压4.0 MPa时，苯酚转化率达98%，加氢脱氧选择性达93%，产物中芳烃含量仅为2.92%，低于欧洲生物质油精制标准（14%）。随着温度的升高，加氢脱氧选择性进一步提高，但是在高温下，催化剂的非晶态结构不稳定，表现为转化率的下降和中间产物含量的增加。

关键词

非晶态催化剂 镍 钼 助剂 加氢脱氧 生物油

分类号

Effect of Co on Ni-Mo-B amorphous catalyst in hydrodeoxygenation

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Abstract

Ni-Mo-B and Co-Ni-Mo-B amorphous catalysts were prepared by chemical reduction method with sodium borohydride aqueous solution.The resulting materials were characterized by BET，SEM，XRD，XPS and DSC.Using phenol as the model compound，the hydrodeoxygenation（HDO）performances of the catalysts were evaluated.With the addition of Co，the particle size became smaller and the electron transfer from Ni to B was promoted.The HDO activity was lower for Ni-Mo-B than for Co-Ni-Mo-B for which phenol conversion 98% and HDO selectivity up to 93% at temperature 523 K were obtained.The aromatic content in the refining of bio-oil was lower than that of European regulation.Although the HDO selectivity goes up with the increase of reaction temperature，the conversion went down and the content of intermediates increased because of unstability of amorphous structure at high temperature.

Key words

amorphous catalyst nickel molybdenum promoter hydrodeoxygenation bio-oil

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