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不同介质中化学还原法制备Co-B非晶态合金及其催化糠醛加氢制备糠醇

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**摘要** 采用化学还原法在不同介质中制备了5种Co-B非晶态合金催化剂,反应介质包括水、乙醇以及不同乙醇含量的乙醇-水混合溶液,并以液相糠醛加氢制备糠醇为探针反应考察了其催化性能。结果表明,反应介质对Co-B催化剂的非晶态结构以及金属Co-B间的电子相互作用没有显著影响。这可以解释所有制得的Co-B催化剂均具有几乎100%的糠醇选择性和相同的面积比活性的原因,根据活性位性质保持不变可认为其本征活性相同。但是,随着水-乙醇混合反应介质中乙醇含量增加,制得的Co-B催化剂的质量比活性迅速增加。这可以归因于大量氧化态硼物种的存在造成的表面积迅速增加,因为氧化态硼物种可以作为载体对Co-B非晶态合金粒子起到分散作用。

**关键词** [溶剂效应](#), [Co-B非晶态催化剂](#), [糠醛加氢](#), [乙醇-水溶液](#)

分类号

## Hydrogenation of Furfural to Furfuryl Alcohol over Co-B Amorphous Catalysts Prepared by Chemical Reduction in Variable Media

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**Abstract** Five Co-B amorphous alloy catalysts were prepared by chemical reduction in different media, including pure water and pure ethanol as well as the mixture of ethanol and water with variable ethanol content. Their catalytic properties were evaluated using liquid phase furfural hydrogenation to furfuryl alcohol as the probe reaction. It was found that the reaction media had no significant influence on either the amorphous structure of the Co-B catalyst or the electronic interaction between metallic Co and alloying B. This could successfully account for the fact that all the as-prepared Co-B catalysts exhibited almost the same selectivity to furfuryl alcohol and the same activity per surface area ( $\text{m}^2$ ), which could be considered as the intrinsic activity, since the nature of active sites remained unchanged. However, the activity per gram of Co ( $\text{g}^{-1}$ ) of the as-prepared Co-B catalysts increased rapidly when the ethanol content in the water-ethanol mixture used as the reaction medium for catalyst preparation increased. This could be attributed to the rapid increase in the surface area possibly owing to the presence of more oxidized boron species which could serve as a support for dispersing the Co-B amorphous alloy particles.

**Key words** [solvent effect](#) [Co-B amorphous catalyst](#) [furfural hydrogenation](#) [ethanol-water solution](#)

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