

超细非晶镍合金的化学制备及类金属元素对性质的影响

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摘要 常温下分别使用KBH₄和NaH₂PO₂在水溶液中还原Ni²⁺制得了Ni₆₅B₃₅和Ni₈₉P₁₁超细非晶合金(UFAAP),同时使用KBH₄和NaH₂PO₂还原Ni²⁺制得了Ni₇₃P₁₃B₁₄UFAAP. Ni-P的粒径较大,约为110nm, Ni-B的粒径较小,约为20nm, Ni-P-B的粒径居其之间,约为40nm. XPS表明, Ni-P间的相互作用强于Ni-B间的相互作用, Ni-P-B中P的电子状态与Ni-P中的相似. Ni-P-B比Ni-P的比表面积高得多, Ni-P-B比Ni-B和Ni-P具有更好的非晶态稳定性,在573K热处理,它的非晶态保持完好. 晶化结果也表明Ni-P-B中Ni-P间的相互作用比Ni-B间的强。

关键词 [催化剂](#) [镍合金](#) [X射线衍射分析](#) [电感耦合等离子体](#) [磷合金](#) [硼合金](#) [非晶态合金](#) [四氢化硼钾](#) [磷酸二氢钠](#)

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The chemical preparation of ultrafine amorphous nickel alloys and the influence of metalloid elements on properties

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Abstract Ni₆₅B₃₅ and Ni₈₉P₁₁ ultrafine amorphous alloy particles (UFAAP) have been prepared by the reduction of Ni²⁺ in aqueous solution with KBH₄ and NaH₂PO₂, respectively, at room temperature. Ni₇₃P₁₃B₁₄ UFAAP has been prepared by the reduction of Ni²⁺ with KBH₄ and NaH₂PO₂ at the same time. The Ni-P sample has relatively large particle size (c.a. 110nm) while Ni-B sample exhibits much smaller particle size (c.a. 20nm). The particle size of Ni-P-B (c.a. 40nm) is close to that of Ni-B. XPS showed that the interaction between Ni and P is stronger than that between Ni and B, since the electronic charge of P is similar in the Ni-P-B and Ni-P samples. However, the Ni-P-B sample is of higher surface area than Ni-P. In an addition, the Ni-P-B sample exhibits higher stability in amorphous state than Ni-P and Ni-B. The amorphous state of the Ni-P-B sample remained after heat treatment in N₂ at 573K. The transformation of Ni₃B to Ni₃P during crystallization of the Ni-P-B sample also indicated that the interaction between Ni and P is stronger than that between Ni and B.

Key words [CATALYST](#) [NICKEL ALLOYS](#) [X-RAY DIFFRACTION ANALYSIS](#) [ICP](#) [PHOSPHORUS ALLOYS](#) [BORON ALLOY](#) [AMORPHOUS ALLOY](#)

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