

### 论文摘要

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### W-Ni-Fe 高密度合金的微波烧结

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**摘要:** 研究90W-7Ni-3Fe高密度合金的微波烧结工艺, 探讨烧结温度和烧结时间等工艺参数对合金密度和力学性能的影响, 并对W晶粒的生长规律进行分析。结果表明: 该合金的微波烧结升温速度快, 烧结周期短; 微波烧结促进合金固结, 在1 480 °C, 5 min条件下, 获得相对密度为99.24%、拉伸强度为925 MPa和伸长率为23.64%的样品; 在短时间内烧结时, 微波烧结样品的W晶粒尺寸小于常规烧结的, 但微波烧结样品的生长速率更快, 微波烧结不宜过度延长烧结时间。

**关键字:** W-Ni-Fe合金; 微波烧结; 晶粒生长

### Microwave sintering of W-Ni-Fe heavy alloys

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**Abstract:** 90W-7Ni-3Fe heavy alloys was preliminarily sintered via microwave radiation, and the effects of sintering parameters, such as peak temperature and sintering time on the density and mechanical performance of alloy were investigated, the grain growth of W was analyzed. The results show that the heating rate of the alloy by microwave sintering technique is fast, therefore the sintering cycle reduces dramatically. The consolidating process is promoted and the as-sintered alloys have excellent properties, such as relative density of 99.24%, tensile strength of 925 MPa and elongation of 23.64% after sintering at 1 480 °C for 5 min. In spite of higher growth rate microwave sintering leads to finer W grain size after short time soaking, compared with conventional sintering, which suggests that microwave sintering leads to higher growth rate of W grains, and the prolongation of sintering time of W in heavy alloys is undesirable.

**Key words:** W-Ni-Fe alloy; microwave sintering; grain growth

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