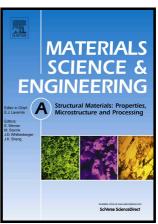
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Microstructures and mechanical properties of directionally solidified Ni-25%Si full lamellar in situ composites

Binggang Zhang¹, Xiaopeng Li¹, Ting Wang²*, ZhengLiu¹

- ¹ State Key Laboratory of Advanced Welding and Joining, Harbin Institute of Technology, Harbin 150001, China
- ² Harbin Institute of Technology at Weihai, Shandong Provincial Key Laboratory of Special Welding Technology
- * Corresponding author at: Shandong Provincial Key Laboratory of Special Welding Technology, Harbin Institute of Technology at Weihai, Wenhua West Road, Weihai 264209, China;Tel: +86-18003640607; Fax: +86-0451 86412911-604. fgwangting@163.com

Abstract:

Directional solidification experiments have been performed on Ni-25at.% Si alloy using electron beam floating zone method. A fully regular eutectic microstructures consisting of Ni, γ -Ni₃₁Si₁₂ and β ₁-Ni₃Si have been obtained. The influences of the directional solidification rate on the microstructures and properties of the full lamellar structures have been studied. The results show that the relationship between the mean interphase spacing (λ) and withdrawal rate (ν) meets λ =29.9 ν -0.65. The hardness increases with the increasing of growth rate (ν) and decreasing of the interlamellar spacing (λ) which meets the relationship of H_V =445.2 ν 0.14 and H_V =910 λ -0.21. The maximum compressive strength, 2576 MPa, for DS samples is obtained by 10mm/h.

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