

عنوان مقاله:

Synthesis of Mo–Si–B nanocomposite powders by mechanical alloying and subsequent heat treatment

محل انتشار:

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خلاصه مقاله:

In this study, Mo–Si–B nanocomposite alloy was synthesized by using a combination of mechanical alloying (MA) and heat treatment. A double-step MA process was carried out in a high energy planetary ball mill. In the first step, Mo-17%mol Si was milled for different milling times. In the second step, B was added to the mechanically alloyed Mo-Si mixtures in order to achieve Mo-12.5Si- 25B, and these new mixtures were milled for 20h. Mechanically alloyed (MAed) powders were annealed in an atmosphere-controlled furnace at 1100°C for 1h. The structural evolutions of MAed and/or annealed powders were evaluated by SEM, optical microscopy, and X-ray diffraction. The lattice parameter of Mo and Mo alloy were estimated using Nelson-Riley function. The results showed that solid solution of α -Mo and small amounts of MoSi₂ were formed after double step mechanical alloying. However, α -Mo-Mo₅SiB₂-MoSi₂-Mo₃Si composite was successfully formed when the MAed powders were annealed. Molybdenum crystallite size in this composite was in the range of 35-50 nm

کلمات کلیدی:

Mechanical alloying; Mo-Si-B; Heat treatment; Nanocomposite

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