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Influence of composition and microstructure on the tribological property of SPS sintered MCrAlY alloys at elevated temperatures

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Abstract:

In order to explore the mechanical and tribological properties of high-temperature alloy materials, the present study aims to investigate the synthesis, microstructure, composition, mechanical and tribological properties of high-temperature monolithic MCrAlY (M=Ni or NiCo) alloys. The alloys were prepared by spark plasma sintering technique. The microstructure and composition were studied by Scanning Electron Microscopy and X-ray diffractometry. The tribological properties of Ni-based alloys were tested by friction tester against Si_3N_4 balls at elevated temperatures. The results showed that the NiCrAlY alloy was composed of γ-Ni(Cr) solid solution, β-NiAl, and γ'-Ni_3Al with little CrAl. The NiCoCrAlY alloy was consisted of γ-Ni(Cr/Co) solid solution, β-NiAl and γ'-Ni_3Al.

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