

Accepted Manuscript

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PII: S0925-8388(17)34429-8

DOI: [10.1016/j.jallcom.2017.12.233](https://doi.org/10.1016/j.jallcom.2017.12.233)

Reference: JALCOM 44319

To appear in: *Journal of Alloys and Compounds*

Received Date: 15 September 2017

Revised Date: 12 December 2017

Accepted Date: 21 December 2017

Please cite this article as: S. Cao, S. Ren, J. Zhou, Y. Yu, L. Wang, C. Guo, B. Xin, Influence of composition and microstructure on the tribological property of SPS sintered MCrAlY alloys at elevated temperatures, *Journal of Alloys and Compounds* (2018), doi: 10.1016/j.jallcom.2017.12.233.

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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 Si₃N₄ balls at elevated temperatures. The results showed that the NiCrAlY alloy was composed of γ -Ni(Cr) solid solution, β -NiAl, and γ' -Ni₃Al with little CrAl. The NiCoCrAlY alloy was consisted of γ -Ni(Cr/Co) solid solution, β -NiAl and γ' -Ni₃Al.

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