T17-137

Tohoku University's Invention

Oxidation resistant Mo-Si-B-Ti-C alloy

High resistance to oxidation up to at least 800℃

Summary

Research on non-cooling high temperature material is conducted in order to run heat engine such as jet engine or gas turbine with high efficiency. Mo-Si-B alloy is focus for its high melting point and high temperature strength. However, in order to applicate to high pressure turbine wings, the sliding friction will be generated at the interface between the turbine wings and the turbine disc. Therefore, the oxidation resistance at sliding friction temperature（approx. 700～ 800℃）needs to be improved.

This invention can provide Mo-Si-B-Ti-C alloy with high oxidation resistance property at least until approx. 800℃, and its manufacturing process. The Mo-Si-B-Ti-C alloy of this invention includes Mo, Si, Ti, C and Cr and/or Al. Compared to Mo-Si-B-Ti-C alloy without Cr / Al, this invention is more light and hard. It can be manufactured by casting so there is possibility to upsize Mo-Si-B-Ti-C alloy.

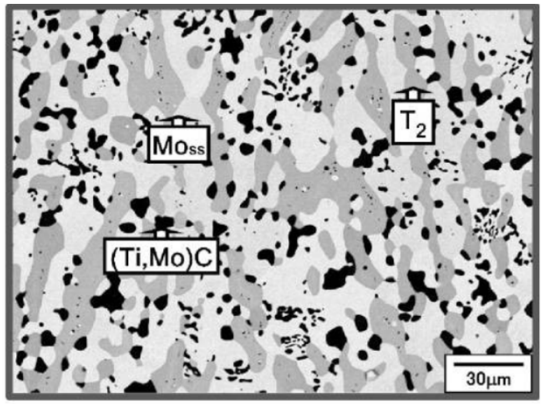
Effect

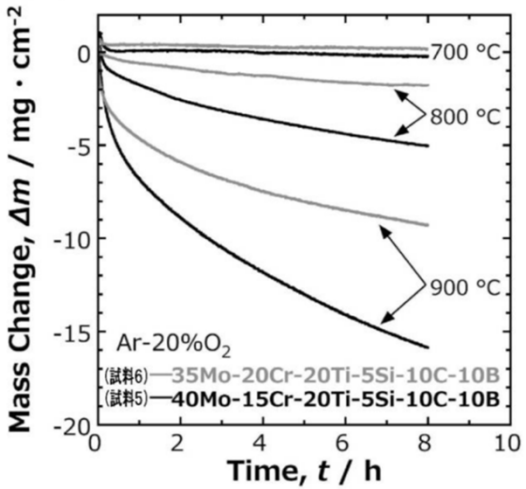
High temperature strength material with high resistance to oxidation up to 800℃

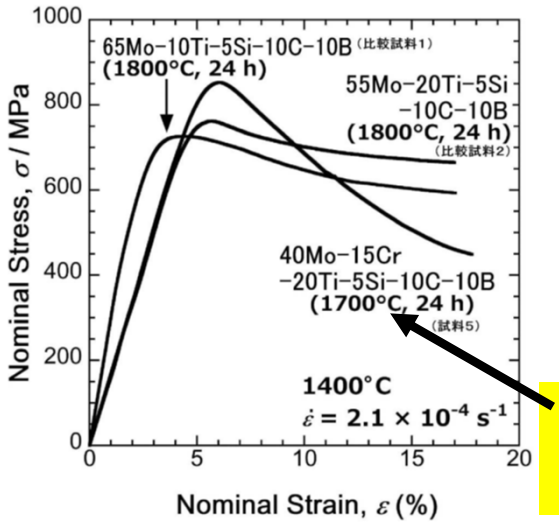
Possible to upsize by casting process

Application

- Tool for friction stir welding (FSW)
- Hot extrusion die
- Gas turbine, high pressure turbine wings for power generation
- Jet engine







This invention

【Up left】SEM picture of this invention Mo-Si-Ti-C alloy after homogenized heat treatment

【Up right】Oxidation resistance results of this invention Mo-Si-Ti-C alloy after homogenized heat treatment

【Down left】High temperature compression test results of this invention Mo-Si-Ti-C alloy after homogenized heat treatment

Patent Data Sheet

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