

High-temperature oxidation-resistant transition metal borides

Exploring the possibility of applying difficult-to-sinter materials to high-temperature structural materials.

Overview

With the increasing demand for highly efficient energy sources and technological developments in the aerospace sector, materials used in these fields are required to be usable in multi-extreme condition. Among promising materials in the aerospace field, TiB_2 is used as a heat-resistant and wear-resistant material due to its high melting point, mechanical strength and high conductivity. However, it is known that the mechanical strength of TiB_2 deteriorates due to the oxidation of the material in a high temperature environment, which limits its industrial application.

The present invention demonstrates the potential of transition metal boride as a structural material in a high-temperature environment without compromising its inherent properties by adding a twist to the sintering process. This is a result of expanding the potential of transition metal borides as structural members, which are limited to powder and thin film applications due to their poor sinterability.

Product Application

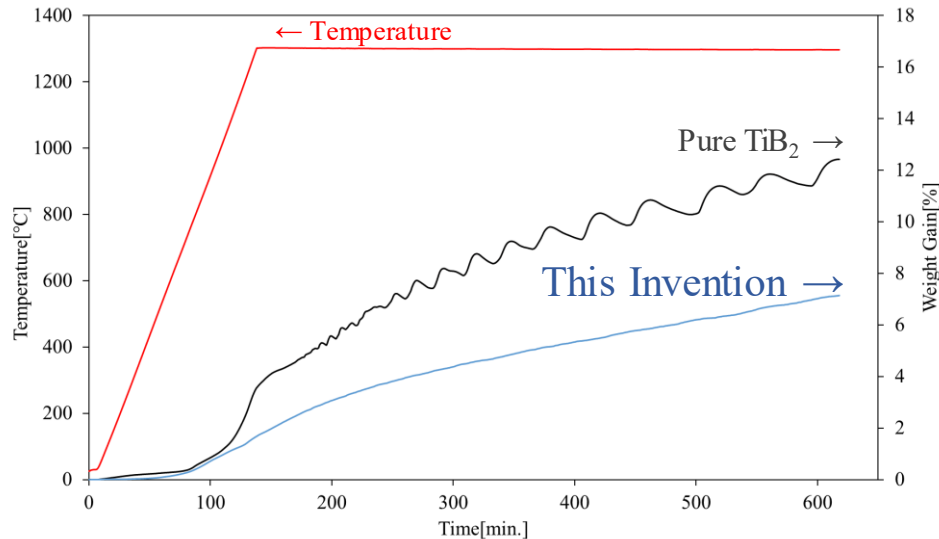
- Cutting tools
- Aircraft and spacecraft parts
- Neutron shielding material
- Sintering jig, etc.

IP Data

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Thermogravimetry



Related Works

[1] Y. Jimba, S. Kondo, H. Yu, H. Wang, Y. Okuno, R. Kasada, Ceramic International 47 (2021) 21660-21667.

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