

Chemical stability of superhard rhenium diboride at oxygen and moisture ambient environmental conditions prepared by mechanical milling

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Abstract

In this study, rhenium diboride (ReB_2) was obtained by mechanosynthesis at 640 minutes of milling. The obtained ReB_2 was stored at oxygen and moisture ambient environmental conditions to know the chemical stability. The results indicate that ReB_2 is totally decomposed at oxygen and moisture ambient environmental conditions. Furthermore, the X-ray diffraction (XRD) analysis of ReB_2 samples after 26 months of storage shows that the final products of degradation are HReO_4 (liquid), H_3BO_3 , HBO_2 , and ReO_3 . Finally, a schematic diagram of the degradation sequence of ReB_2 at oxygen and moisture ambient environmental conditions is proposed and validated with a thermodynamic analysis.

REFERENCES

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