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Properties of the SIBOR® Oxidation protective Coating on refractory Metal Alloys

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H.-P. Martinz*, B. Nigg*, J. Matej**, M. Sulik*, H. Larcher* and A. Hoffmann*

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* PLANSEE AG, Reutte, Austria

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** Laboratory of Inorganic Materials of ASCR and ICT, Prague, Czech Republic

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Abstract

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The SIBOR® (Si-10B-2C) oxidation protective coating was applied onto molybdenum-, molybdenum – 3 volume % ZrO₂ (zirconia) – and tungsten – samples by APS (= Atmospheric Plasma Spraying) with a subsequent heat treatment. The coated samples were submitted to ramp oxidation tests with heating rates of 10°C / hour up to a temperature of 1450°C with a subsequent dwell time of 24 hours. This procedure simulates the heating up of a glass melting tank where SIBOR® coated parts are most frequently used.

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SIBOR® proved to be an excellent oxidation protective coating for the molybdenum – zirconia – material and for TZM like for pure molybdenum, but not for tungsten, most probably because of the different thermal properties of the refractory metal oxides being formed.

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Keywords

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SIBOR, molybdenum, tungsten, oxidation protection, glass melt, dissolution

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Introduction

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SIBOR®, a Si-B-C based APS – coating, initially developed as an oxidation protection system on molybdenum [1 – 6] for glass melting tank applications has been identified to be also of interest for the refractory metal materials W, TZM and Mo – ZrO₂, which can be used in various other high temperature environments.

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References

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1. M. Sulik, and H.P. Martinz, *Int Glass Rev* **18** [2], 22-25, (2000)
2. J. Disam et al., *Proceedings 14th International Plansee Seminar*, vol. 1, G. Kneringer et al. Eds., Reutte/Tirol, pp. 269-86, (1997)
3. W.D. Callister, *Materials Science and Engineering*, pp. 423-28, John Wiley, New York, (2000)

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