International Journal of Refractory Metals and Hard Materials 107 (2022) 105875

Contents lists available at ScienceDirect

International Journal of Refractory Metals and Hard Materials

journal homepage: www.elsevier.com/locate/IJRMHM

Corrigendum

Corrigendum to "Micropillar compression of single crystal tungsten carbide, Part 1: Temperature and orientation dependence of deformation behaviour" [International Journal of Refractory Metals and Hard Materials 102 (2022) 105729]

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The authors regret the following corrigendum:

The addition of basal slip does not provide five independent slip systems to fulfil the Von Mises criterion for arbitrary polycrystal deformation: neither <a > prismatic nor basal plane slip can generate axial strain along [0001], therefore cracking cannot be totally suppressed by these slip systems alone. A detailed explanation can be found in References [1, 2]. This can also be expressed in terms of loading stress: uniaxial stress along [0001] will activate slip on neither prismatic nor basal planes, as their Schmid factors are all zero.

The availability of basal slip in addition to prismatic slip can still explain the increased high temperature ductility of WC polycrystals or hardmetals. In practice, the local stress state at a WC grain does not remains exactly uniaxial along [0001] in a polycrystal; as soon as the local shear stress resolved onto a prismatic or basal plane is high enough to activate dislocation slip, the crystal lattice can then rotate into a more favourable orientation for further slip. An example of this is the basal-oriented micropillar in Part 2 of this study [3], where the pillar compression axis was initially 10° from [0001].

The authors would like to acknowledge the reader who emailed the editor pointing out this mistake and apologise for any inconvenience caused.

References

[1] V. Jayaram, R. Sinclair, D.J. Rowcliffe, Intergranular cracking in WC-6% co: an application of the von mises criterion, Acta Metall. 31 (3) (1983) 373–378, https://doi.org/10.1016/0001-6160(83)90214-6.

[2] V. Jayaram, Plastic incompatibility and crack nucleation during deformation on four independent slip systems in tungsten carbide-cobalt, Acta Metall. 35 (6) (1987) 1307–1315, https://doi.org/10.1016/0001-6160(87)90012-5.

[3] V. Tong, H. Jones, K. Mingard, Micropillar compression of single crystal tungsten carbide, part 2: lattice rotation axis to identify deformation slip mechanisms, Int. J. Refract. Met. Hard Mater. 103 (November 2021) (2022) 105734, https://doi.org/10.1016/j.ijrmhm.2021.105734.

DOI of original article: https://doi.org/10.1016/j.ijrmhm.2021.105729.

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https://doi.org/10.1016/j.ijrmhm.2022.105875

Available online 25 May 2022
0263-4368/