CREEP OF HFB2-BASED UHTCS UP TO 2000 ºC

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Ultra-high temperature ceramics (UHTCs) are promising candidates for hypersonic applications as a consequence of their high melting points, in excess of 3000 ºC for ZrB_2 and HfB_2 UHTCs. The UHTCs community has traditionally focused on development of more oxidation-resistant UHTC composites as a consequence of poor oxidation resistance of monolithic UHTCs, which has led to the choice of SiC-reinforced MeB2 (where Me is Zr or Hf) as the baseline material for extreme environments. An overview of current understanding of high temperature creep of MeB2–based UHTCs will be described, discussing the following points:

- Poor creep resistance of SiC-reinforced HfB_2 and their structural instabilities.
- Plastic behavior of HfB_2 which deforms like an hcp-metal.
- Plastic behavior of HfB_2/2 wt.% La_2O_3 or how to maintain the creep resistance while improving the oxidation resistance.
- New approaches to increase the creep resistance of HfB_2