

## **POROUS ZrB<sub>2</sub> MANUFACTURING FOR TRANSPIRATION COOLING SYSTEMS FOR HYPERSONIC FLIGHTS**

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The basis of transpiration cooling is the introduction of a cool layer of gas between the component and the hot freestream flow in order to reduce the heat flux to the material. This work addresses the manufacturing of innovative porous Ultra High Temperature Ceramics (UHTCs) to be used as porous walls in these systems. ZrB<sub>2</sub> samples with different porosities that can deliver a fluid to the surface were manufactured by partial sintering or by addition of volume fractions of fugitive inclusions, using starch as a pore former. Furthermore, systematic experiments were carried out in order to measure the relationship between pore structure, porosity and some properties such as permeability of the cooling gas, strength and conductivity. All this information enabled to select the most relevant candidate for the application that can maintain excellent thermal and structural properties while moving to a high porosity.