

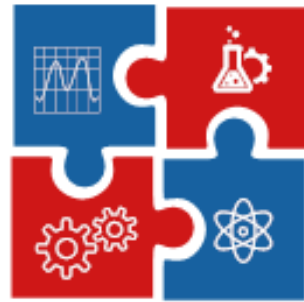
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**CNN TECH**

**„International Conference of Experimental and  
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**Programme  
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The Book of Abstracts**

**29 June – 02 July 2021**

**Zlatibor, Serbia**

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# **CNN TECH 2021**

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# PREPARATION AND CHARACTERIZATION OF ZrB<sub>2</sub>- TiB<sub>2</sub> BASED COMPOSITES FOR HYPERSONIC SYSTEMS

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## Abstract

*ZrB<sub>2</sub> ceramics are considered potential materials for hypersonic systems in view of the melting point exceeding 3000 °C and excellent ablation resistance. Second phases, including SiC or CrB<sub>2</sub>, further improve the oxidation behavior, whereas a lighter phase, like TiB<sub>2</sub> can decrease the overall weight. In this work, a powder mixture containing ZrB<sub>2</sub>, TiB<sub>2</sub>, CrB<sub>2</sub> and SiC was mechanically activated using high energy ball-milling. Sintering was performed by hot pressing following different thermal cycles, and subsequent annealing to remove oxide phases and reduce micro-cracking. The microstructure and hardness of the dense ceramics are compared in relationship to the thermal history. Fully dense ceramics were obtained with different oxide-phases amount depending on the sintering cycle and hardness approaching 24 GPa were achieved. Future works will explore the strength and oxidation resistance of this multi-phase system to check its suitability for hypersonic systems.*

## Keywords

mechanical activation, sintering, XRD, mechanical properties, ceramics.

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