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Manufacturing of monolithic heat shields using FAST/SPS and ACS technologies

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The study presents a technology enabling the fabrication of ZrO_2–CNT composites for heat shield applications using the FAST/SPS method. As key components of vehicles traveling outside the Earth's atmosphere, heat shields require materials that meet strict performance criteria, particularly those related to thermal properties. The proposed methodology enabled the production of a monolithic heat shield demonstrator using FAST/SPS technology.
Zirconium dioxide (ZrO_2) exhibits properties that make it suitable for a wide range of applications, while carbon nanotubes (CNTs) show significantly higher electrical conductivity. Their combination in the 3YSZ-10MWCNT composite makes the material well suited for FAST/SPS processing. Additionally, a protective coating deposited by ACS (aerosol cold spraying) was applied to prevent CNT oxidation. The approach allows the fabrication of monolithic heat shield structures, but scaling is restricted by the maximum sample diameter feasible in current FAST/SPS systems.

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Professional Status of the Speaker

Senior Scientist

Interest in submitting a paper in a special issue of

No interest

Invitation letter for visa

No

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