CERAMIC COMPOSITES FOR HIGH TEMPERATURE AEROSPACE STRUCTURES AND PROPULSION SYSTEMS

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The development of ceramic composites with optimized fiber architectures for application in hypersonics, turbine engines, and rocket nozzles will be discussed. The most extreme applications use active cooling, enabled by the use of thin textile-based hot skins that are able to tolerate extreme thermal gradients. They can also be formed into structures that enable other functionality, including transpiration and film cooling, mitigation of thermal stresses, and shape-morphing structures with potential use in combustion flow paths of hypersonic vehicles. The major challenges and strategies for realizing the potential of these ceramic composite structures will be discussed.