

升温热冲击环境下超高温陶瓷材料抗热震性能的热-损伤模型 (PDF)

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Title: A thermo-damage-dependent thermal shock resistance model for ultrahigh temperature ceramics for temperature rising thermal shock environment

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关键词: [关键词: 超高温陶瓷; 抗热震性能; 损伤; 微裂纹](#)

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摘要: 摘要: 在现有的抗热震理论上考虑到超高温陶瓷材料热物理性能对温度的敏感性及其在服役过程中随温度的演化, 建立了适用于升温服役环境下表征超高温陶瓷材料抗热震性能的热-损伤模型。该模型考虑了微裂纹尺寸、密度、热冲击环境温度等因素对材料抗热震性能的影响。利用此模型研究了超高温陶瓷材料在升温服役环境下损伤以微裂纹形核规律演化时对其抗热震性能的影响。从理论上验证了基于材料微结构设计思想在制备超高温陶瓷材料时, 引进一定密度一定尺寸的微裂纹并控制其随温度演化规律以形核方式进行, 既可以使材料保持较高的强度又能大幅度提升材料的抗热震性能。

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