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## 2D C/SiC 复合材料的静压痕力的损伤表征

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### The Characterization of Indentation of 2D C/SiC Composites Subjected to Quasi-static Indentation

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摘要

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摘要 为考察2D C/SiC 复合材料在外力作用下产生的不可见损伤对其力学性能的影响。通过静压痕实验引入损伤,采用红外热波成像和残余性能测试的方法,表征2D C/SiC 复合材料的损伤。结果表明:施加能量为0.75 J时,复合材料内部开始产生损伤,施加能量为1.8 J(接触力1 700 N、压痕深1 mm)时,损伤模式发生转变;随着损伤程度的加重,残余压缩强度下降率约为残余拉伸强度下降率的2倍。

关键词: 静压痕 施加能量 压痕 损伤阻抗 损伤容限

Abstract: In order to examine the mechanical properties of 2D C/SiC composites with invisible damages induced by external forces, this paper employed thermal imaging testing and residual strength testing to characterize the damage of 2D C/SiC composites induced by quasi-static indentation (QSI). The results indicated that when the energy applied reached 0.75 J, damage started to occur inside the composites; above 1.8 J (the contact force was above 1 700 N, and the depth reached 1 mm), the damage mode transformed. With the aggravation of the damage, the decreasing rate of residual compressive strength was nearly 2 times higher than that of the residual tensile strength.

Keywords: quasi-static indentation loaded energy indentation damage resistance damage tolerance

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