

MATERIALS AND STRUCTURES SYMPOSIUM (C2)  
Advanced Materials and Structures for High Temperature Applications (4)

Author: Mr. JinHuang Zheng  
China

Prof. Hong Cui  
China

MECHANICAL AND ABLATIVE PROPERTIES OF C/C COMPOSITES MODIFIED BY SiC USING  
LIQUID SILICON INFILTRATION METHOD

**Abstract**

SiC modified C/C (C/C-SiC) composites were prepared through incorporating SiC matrix into porous C/C composites using liquid silicon infiltration (LSI) method. The porous C/C composites with a density of 0.96, 1.31, 1.50, 1.68, and 1.81 g/cm<sup>3</sup> were produced by a sequent processing of isothermal chemical vapor infiltration and polymer impregnation and pyrolysis using carbon fiber needle felts as the performs. The initial density of the performs was 0.56g/cm<sup>3</sup>. The mechanical and ablative properties of C/C-SiC composites were investigated using three-point flexural testing and oxyacetylene torch flame. Results show that C/C-SiC composites possess excellent ablation resistance and can be used in the ablation environment of 2100 °C for long time, compared with C/C composites. The composites with the density of 2.0 g/cm<sup>3</sup> exhibit relatively superior mechanical and ablative properties, which is prepared from the porous C/C composites of the density 1.81 g/cm<sup>3</sup>. The corresponding flexural strength of the composites reaches 142.6 MPa under normal temperature, while the mass ablation rate is 0.610-4 g/s under the ablation temperature of 2100 °C holding for 600 s.