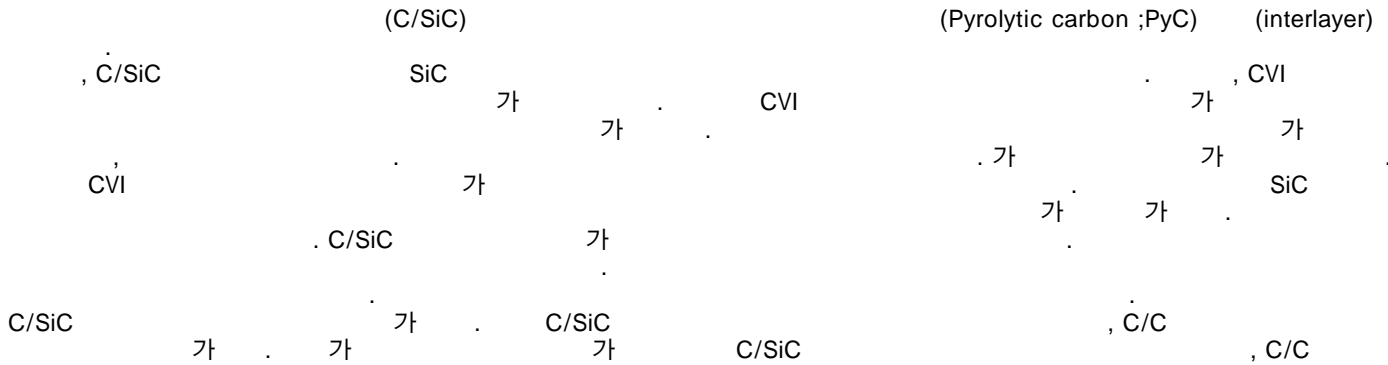


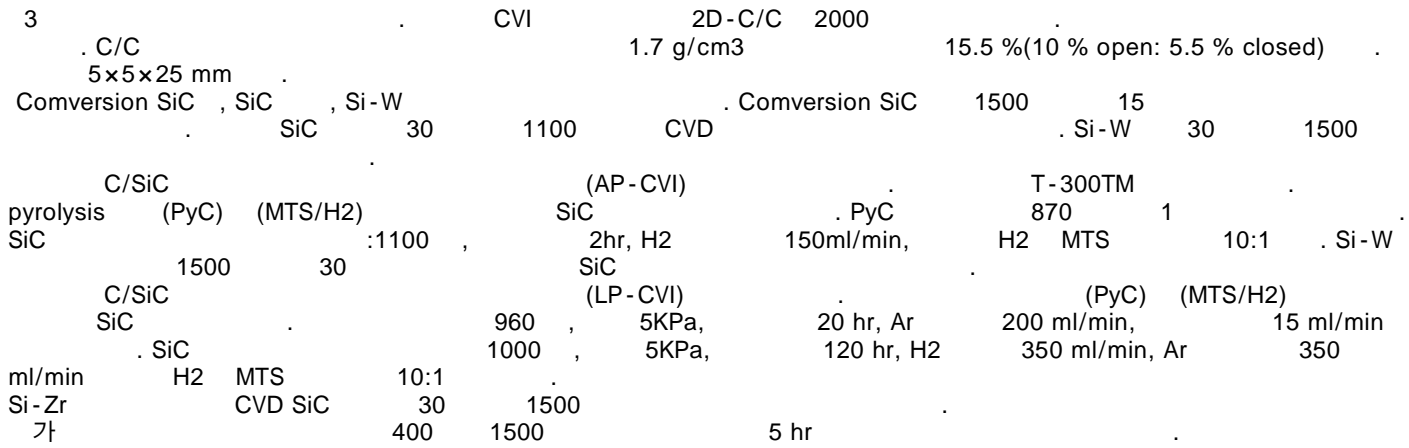
(interlayer) C/SiC

<L. Cheng, Y. Xu, L. Zhang, X. Yin. Materials Science and Engineering, 300, 219-225 (2001)>

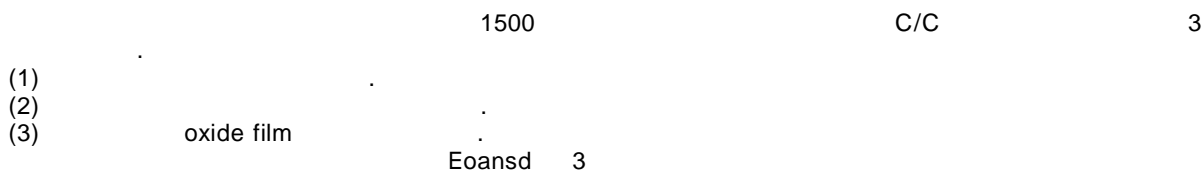
1.



2.



3.



- (1)
- (2)
- (3)

$$\Delta W_C = A_C(1 - \exp(-B_C T^{n_C})), \quad (1)$$

$$\Delta W_S = A_S(1 - \exp(-B_S T^{n_S})), \quad (2)$$

$$\Delta W_F = A_F(1 - \exp(-B_F T^{n_F})), \quad (3)$$

A, B, N C W C/C, S, F oxide film 3

$$\Delta W = \Delta W_C + \Delta W_S + \Delta W_F, \quad (4)$$

가 3 C/SiC 가 SiC

$$\Delta W_{S'} = A_{S'}(1 - \exp(-B_{S'}T^{n_{S'}})), \quad (5)$$

S'
1500

C/SiC

4가

가

$$\Delta W = \Delta W_C + \Delta W_S + \Delta W_{S'} + \Delta W_F. \quad (6)$$

4.

3
Table 1

	C			S			S'			F		
	C/C	U-C/SiC	L-C/SiC	C/C	U-C/SiC	L-C/SiC	C/C	U-C/SiC	L-C/SiC	C/C	U-C/SiC	L-C/SiC
A	-10.3	-30.2	-9.8	-10.3	26.2	8.8	110.6	1.4	-4.7	4.4	3.2	
B	-1.0×10^{-10}	-3.0×10^{-10}	-1.0×10^{-9}	-1.0×10^{-10}	-2.0×10^{-10}	-2.0×10^{-9}	-1.7×10^{-17}	-4.0×10^{-14}	-1.0×10^{-23}	-3.0×10^{-23}	-6.0×10^{-24}	
n	11.8	14.4	12.8	9.9	10.4	10.8	13.0	14.2	20.5	21.3	23.2	

3

3

가

가

가

가

가

PyC

Si-C

가

SiC

C-

C/SiC

C/C

가

C/SiC
SiC

C/C

가

C/SiC

SiC

3가

Table 2

Composites with a coating	Coating cracking temperature (°C)	Matrix cracking temperature (°C)	Transition temperature (°C)
C/C	1250		800
AP-CVI C/SiC	1150	1000	760
LP-CVI C/SiC	1050	900	680

C/SiC thermal expansion (CTE)

가

SiC

coefficient of CVD SiC CTE

LP-CVI C/SiC

CVI

Si-Zr AP-CVI C/SiC

Si-W 100 C/SiC

CTES AP

LP-CVI C/SiC LP-CVD

AP-CVI C/SiC MTS/H2

PyC interlayer CTE

10

가

SiC

AP

LP-CVD

CTE

가

AP-CVD

CTE

SiC

CTE

LP-CVD

SiC

CTE

가

Fig. 2 TEM mm(Fig. 2.b)

LP-CVI C/SiC PyC interlayer

0.3 mm(Fig. 2.a)

AP-CVI C/SiC

80

PyC interlayer

C/SiC SiC

가

SiC

AP-CVI C/SiC

300-400 MPa,

LP-CVI C/SiC

700-800 MPa

CVI

CTE C/SiC

C/SiC

AP-CVI C/SiC

100

C/C

C/SiC

LP-CVI

가

가

가

AP-CVI C/SiC

LP-CVI C/SiC

가

C/SiC

PyC C/C
 가 T300 가 PyC 30 Kcal/mol PyC T300 , PyC
 26 Kcal/mol 가 가 가 Arrhenius C/SiC (Table. 3).
 가 가 가 가 가 C/SiC
 가 가 가 C/SiC 가 가 가
 가 가 가 LP-CVI C/SiC 가 LP-CVI C/SiC C/C AP-CVI C/SiC 가
 가 가 가 가 가 가 가 가
 LP-CVI C/SiC AP-CVI C/SiC 가 ,
 C/C AP-CVI C/SiC 가 ,
 Si-W AP-CVI C/SiC 5 hr CVD SiC Si-W (Si-W)
 Si-Zr AP-CVI C/SiC Si-W CVD SiC Si-W
 Si-W Si-W

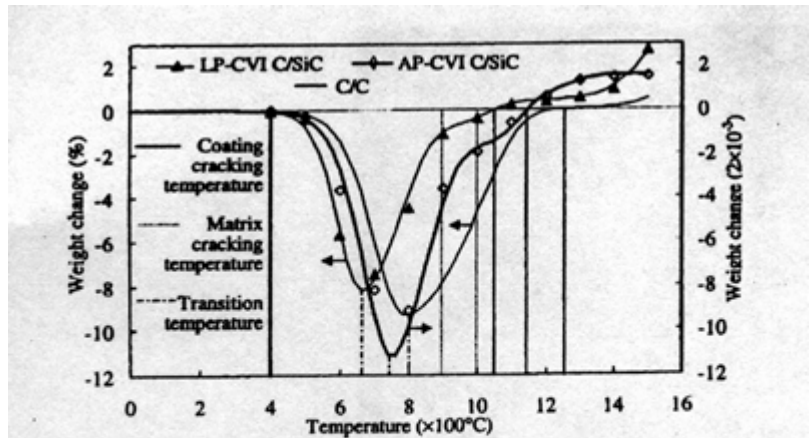


Fig. 1. Relation curves of weight change after 5 h oxidation with temperature for the C/C composite with a Si-W outer-layer coating and the C/SiC composites with a Si-W outer-layer coating and a Si-Zr outer-layer coating.

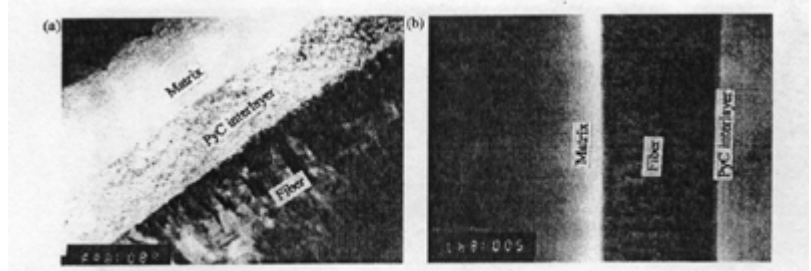


Fig. 2. TEM micrograph of PyC interlayer in (a) LP-CVI C/SiC, (b) AP-CVI C/SiC.

5.

interlayer LP-CVI C/SiC SiC AP-CVI C/SiC C/C 100 PyC
 C/SiC 가 가 가 AP-CVI C/SiC 100 PyC interlayer가
 가 가 가 가 가 가 가 가 가 가
 Arrhenius 가 가 가 가 가 가 가 가 가 가
 Si-Zr Si-W C/C C/SiC 가 가 가 가 가 가 가 가 가 가