

**<SiC/SiC minicomposites with nanoscale multilayered fiber coatings>**  
 by S. Bertrand, R. Pailler, J. Lamon, from Composites Science and Technology, 61 363-367 (2001).

- CVI Hi-Nicalon SiC / (PyC/SiC)<sub>n</sub>

**1.**

CMCs (CMCs)  
 CMCs (PyC) SiC/SiC, SiC/SiC  
 CMCs PyC/SiC (PyC/SiC)<sub>n</sub> 가 2D Nicalon/SiC CVI (PyC/SiC)<sub>n</sub>  
 Nicalon NL 202 (PyC/SiC)<sub>n</sub> 가 SiC Hi-Nicalon/SiC 가 Hi-Nicalon/SiC (PyC/SiC)<sub>n</sub>  
 Hi-Nicalon/SiC 가

**2. Experimental**

**2.1.** -T) 500 P-CVI 10 PyC-SiC (PyC =20 nm, SiC =50 nm) Table 1 (Hi-Nicalon (-B

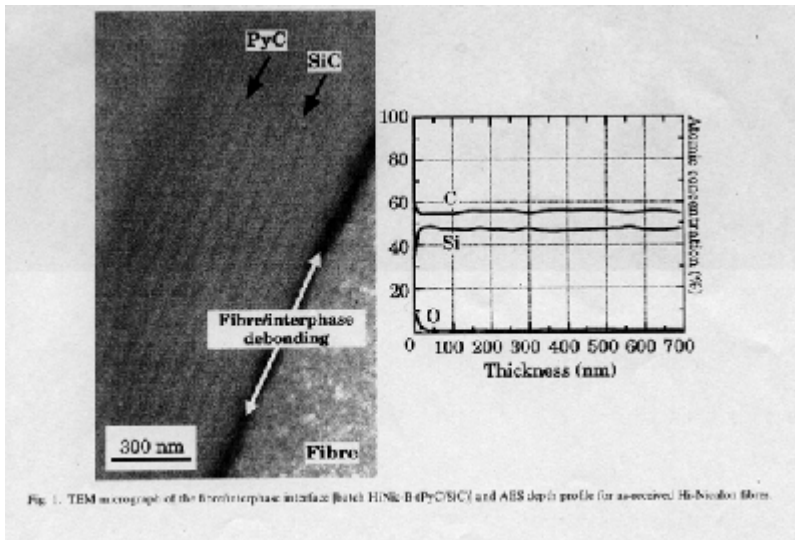


Fig. 1. TEM micrograph of the fibre interphase interface (left) HiNicalon B (PyC/SiC) and AES depth profile (for as-received Hi-Nicalon) fibres.

**2.2.** TEM Auger (AES) 20mm 가

hysteresis loop

가 10% 10mm SEM 700 oC (80N)

**3. Results**

3.1. Fig. 1 Hi-Nicalon 가 HiNic-B-(PyC/SiC) 가 SiO<sub>2</sub>+  
 TEM (-15 nm) 가  
 -C (Si/C/O) Fig.1 /  
 Hi-Nicalon AES free-C (80 nm)

Fig. 2 TEM  
(10 )

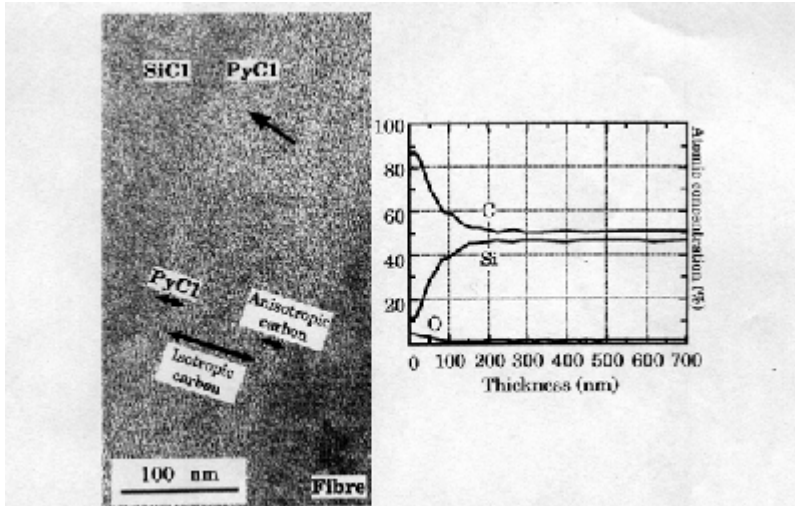


Fig. 2 TEM micrograph of the fiber/interphase interface (batch HiNiC-T (PyC/SiC)) and AES depth profile for treated Hi-Nicalon fibres

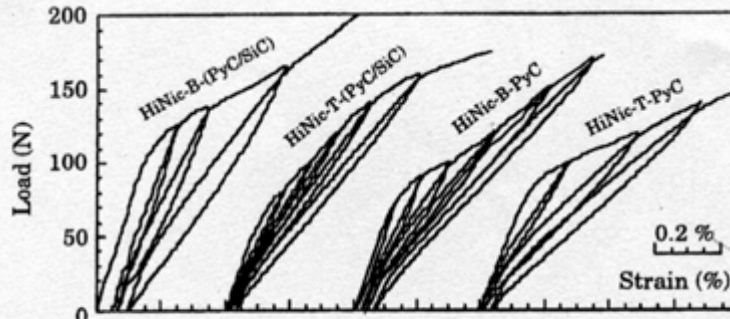


Fig. 3. Force/deformation curves.

3.2. \_\_\_\_\_ :

Fig. 3  
Hi - Nicalon

( 2). 가 Hi-Nicalon

=113 MPa

(Fig.4)

(1) 가 (가 ) .

$E/E_0$

(2)

$V_f \cdot E_r / E_0$

$E/E_0$ 가  
HiNiC-T-PyC

2

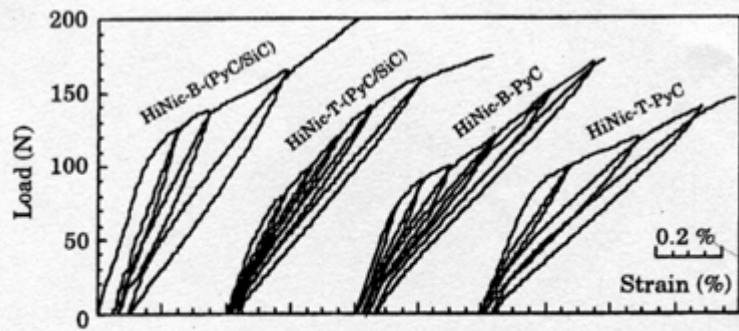


Fig. 3. Force/deformation curves.

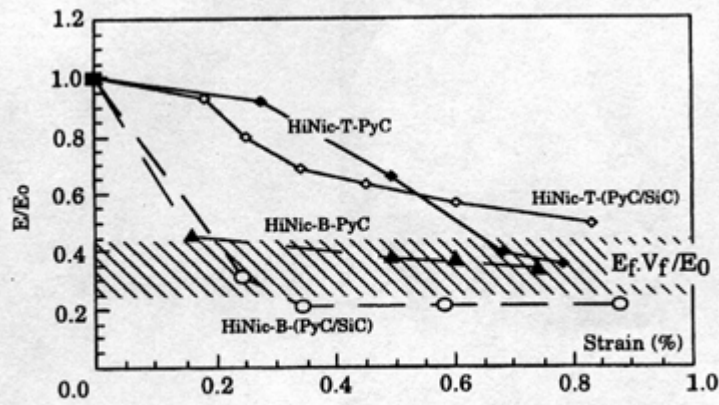


Fig. 4. Evolution of relative minimum tangent modulus  $E/E_0$  versus applied deformation.

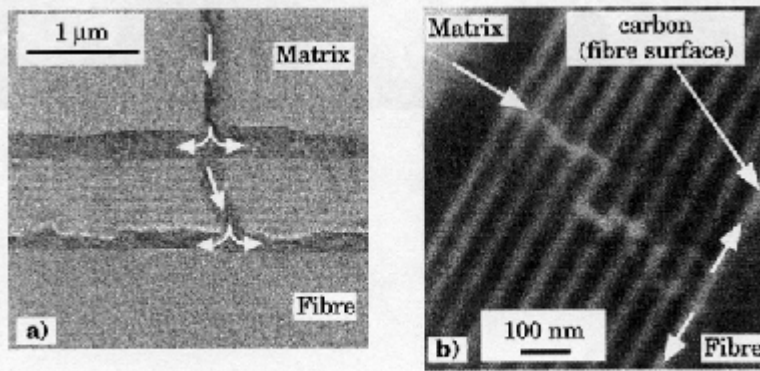


Fig. 5. TEM micrographs showing the deflection of matrix cracks (according to [5] and [8]).

3.3. \_\_\_\_\_ : Fig. 5 . HiNiC - B - (PyC/SiC)

HiNiC - T - (PyC/SiC)

PyC

3.4. \_\_\_\_\_ : 2 150h .(Table 2)

가

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Table 1  
Minicomposites that have been examined

Batches	Hi-Nicalon tows	Interphase		
		$e$ (PyC) (nm)	$e$ (SiC) (nm)	$n$
HiNic-B-PyC	As-received	100	0	1
HiNic-T-PyC	Treated	100	0	1
HiNic-B-(PyC/SiC)	As-received	20	50	10
HiNic-T-(PyC/SiC)	Treated	20	50	10

Table 2  
Thermomechanical properties of the minicomposites

Batches	Proportional limit		Failure		$\tau$ (MPa)	Lifetime (h)
	Force (N)	Deformation (%)	Force (N)	Deformation (%)		
HiNic-B-PyC	71	0.09	171	0.69	50	2
HiNic-T-PyC	80	0.17	156	0.81	46	100
HiNic-B-(PyC/SiC)	88	0.12	195	0.83	35	22
HiNic-T-(PyC/SiC)	45	0.07	183	0.79	113	150

### 5. Conclusions:

SiC, Hi-Nicalon, 700 oC, 가, (i) (ii) 가