

Three siloxane/SiC powder blends were prepared using the following procedure: A sample of the siloxane prepared above was dissolved in toluene in a glass flask by stirring for several minutes. To this solution is added the Lupersol™ curing agent and the sintering aid followed by mixing. The silicon carbide powder was then added to the solution and mixed via sonic mixing for 10 minutes. The mixture was then stripped via rotary evaporator, dried, ground and sieved through 325 mesh. The sieved powder was dry pressed into test bars at approximately 20–35 ksi and cured. The test bars were fired to various temperatures in an Astro tube furnace (argon atmosphere). The porosity, density, strength, microstructure and young's modulus of the fired test bars were measured. The results obtained are shown in Table 2:

Blend 3:	Ibiden ultrafine beta-SiC Powder	675 g
	Siloxane	95.59 g
		12.84 g
	Lupersol™	3.09 g
	Amorphous boron	3.38 g (0.5%)
(formed into \leq 400 mesh spray dried granules)		
Blend 4:	Ibiden ultrafine beta-SiC Powder	100 g
	Siloxane	21.25 g
		3.04 g
	Lupersol™	0.70 g
	Boron Carbide	0.15 g (0.15%)
Blend 5:	Ibiden ultrafine beta-SiC Powder	149.6 g
	Siloxane	21.25 g
		3.01 g
	Lupersol™	0.70 g
	Boron Carbide	0.08 g (0.05%)

stirred with 5.3 g (0.05 mole) of Me_2ViSiCl , filtered through a 0.2 micron membrane and stripped in vacuo at 150° C. to give a soft resin.

Cross-linker Synthesis

A mixture of 683 g $\text{Ph}_2\text{Si}(\text{OMe})_2$, 630 g of a $(\text{MeHSi-O})_n$ fluid and 61 g of $(\text{Me}_3\text{Si})_2\text{O}$ was added to a solution of 2.25 g of trifluoromethane sulfonic acid in 190 g of water and 2 kg of toluene. After approximately 20 minutes, the mixture was refluxed for 2 hours. The mixture was cooled and then neutralized with 2.73 g of potassium carbonate. 900 g of volatiles were removed by distillation until a temperature of 110° C. was reached. The remaining volatiles were removed by azeotroping to a pot temperature of 120° C. The solution was filtered and rotary evaporated to yield 1100 g of a high molecular weight Si-H functional siloxane fluid.

B—Polymer Pyrolysis and Char Composition Calculations

A mixture of 10.0 g of the above polymer, 1.85 g of the Si-H functional siloxane fluid and 0.15 g Lupersol catalyst (2,5-bis(t-butylperoxy)-2,3-dimethylhexane) was prepared. An aliquot of the blend was cross-linked at 180° C. for 1 hour. An aliquot of the crosslinked polymer was weighed into a graphite crucible. The crucible was transferred into an Astro tube furnace. The furnace was evacuated to <20 torr and then backfilled with argon. This backfill procedure was repeated twice. Under a purge of argon the sample was heated to 1800° C. at 10° C./min and held at temperature for 1 hour before cooling to room temperature. The sample had a mass retention of 43.8% and contained 37.5% carbon. The following calculations were made: 100 g of cured

TABLE 2

Blend	Green Density*	Firing Temp °C.	Fired Density*	Open Porosity#	Linear Shrinkage	3pt Bend Strength*	Young's Modulus*
3	2.16	1600	2.14	32.5%	1.87%	21	<10
		1800	2.34	26.2%	4.91%	37	16.6
		1900	2.86	9.5%	11.41%	63	32.9
4	2.20	1800	2.18	31.8%	1.87%	33	12.8
		1900	2.19	31.5%	2.05%	35	15.2
		1995	2.25	29.2%	2.89%	31	16.3
		2070	2.32	26.2%	3.81%	36	17.2
		2100	2.37	25.1%	4.96%		
5	2.16	1800	2.15	31.8%	2.05%	29	12.7
		1900	2.16	31.7%	2.35%	33	13.1
		1995	2.19	30.4%	2.44%	31	14.4
		2070	2.20	29.6%	2.76%	35	15.7
		2100	2.19	30.6%	2.45%		
3**	2.16	1800	2.18	24.2%	2.13%	23	10.2
		1900	2.43	18.1%	5.88%	54	19.6
		1995	2.53	16.5%	7.66%	50	22.2
		2070	2.69	11.5%	9.26%	72	26.9
		2100	2.74	10.5%	9.71%	67	29.3

*Density in g/cm^3 ; Strength in ksi; Modulus in msi

**Fired in nitrogen

EXAMPLE 3

A. Polymer Synthesis

To a three-necked 5 L flask equipped with a drainage stopcock, thermometer, condenser and addition funnel was added 895 g of water and 162 g of isopropyl alcohol. A mixture of 10.45 g (0.07 moles) of Me SiCl_3 , 30.94 g (0.24 mole) of Me_2SiCl_2 , 4.34 g (0.04 mole) of Me_3SiCl , 21.13 g (0.15 mole) of MeViSiCl_2 and 105.7 g (0.50 mole) of PhSiCl_3 in 390 g of toluene was added below the water surface over a six minute period. After stirring for 30 minutes the water layer was drained. The resin layer was washed with 2 1 L portions of water. The resin layer was dried and concentrated in vacuo to approximately 60% solids. This solution was then

polymer gives 43.8 g of a ceramic char consisting of 37.5% carbon and 62.5% silicon (by difference). (In order to simplify the calculations, the amount of oxygen has been ignored.) The char consists of 36.97 g SiC and 4.83 g excess carbon. Therefore, each gram of polymer, after pyrolysis, gives 0.370 g SiC and 0.048 g free carbon.

C—Test Bar Fabrication

In a 60 mL bowl of a Hauschild Dental Mixer was place 86 g Ibiden UF-SiC powder, 21 g of the resin described above and 4 g of the Si-H functional fluid described above. The mixer was run at 4 times 10 seconds at which time the mixing was stopped and the material allowed to cool for 5 minutes. 0.5 g Lupersol™ was then added and the mixing continued for 2