Electronic Supplementary Material (ESI) for RSC Advances.

Electronic Supplementary Information

Hierarchically Porous Biomorphic Polymer Derived C-SiOC Ceramics

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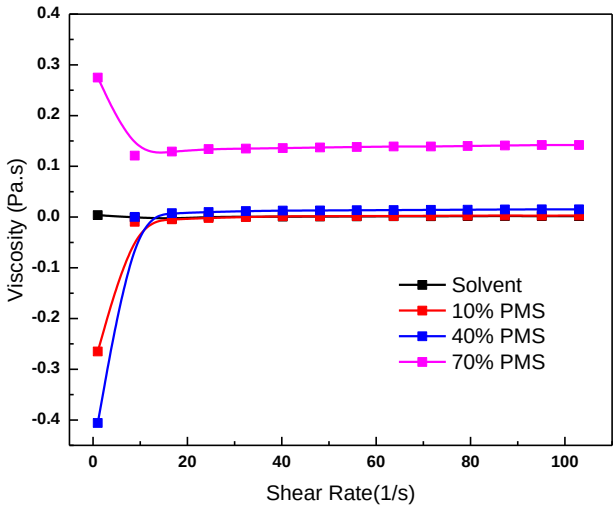

Figure S1: Viscosity of the polymer solution with the increase in shear rate

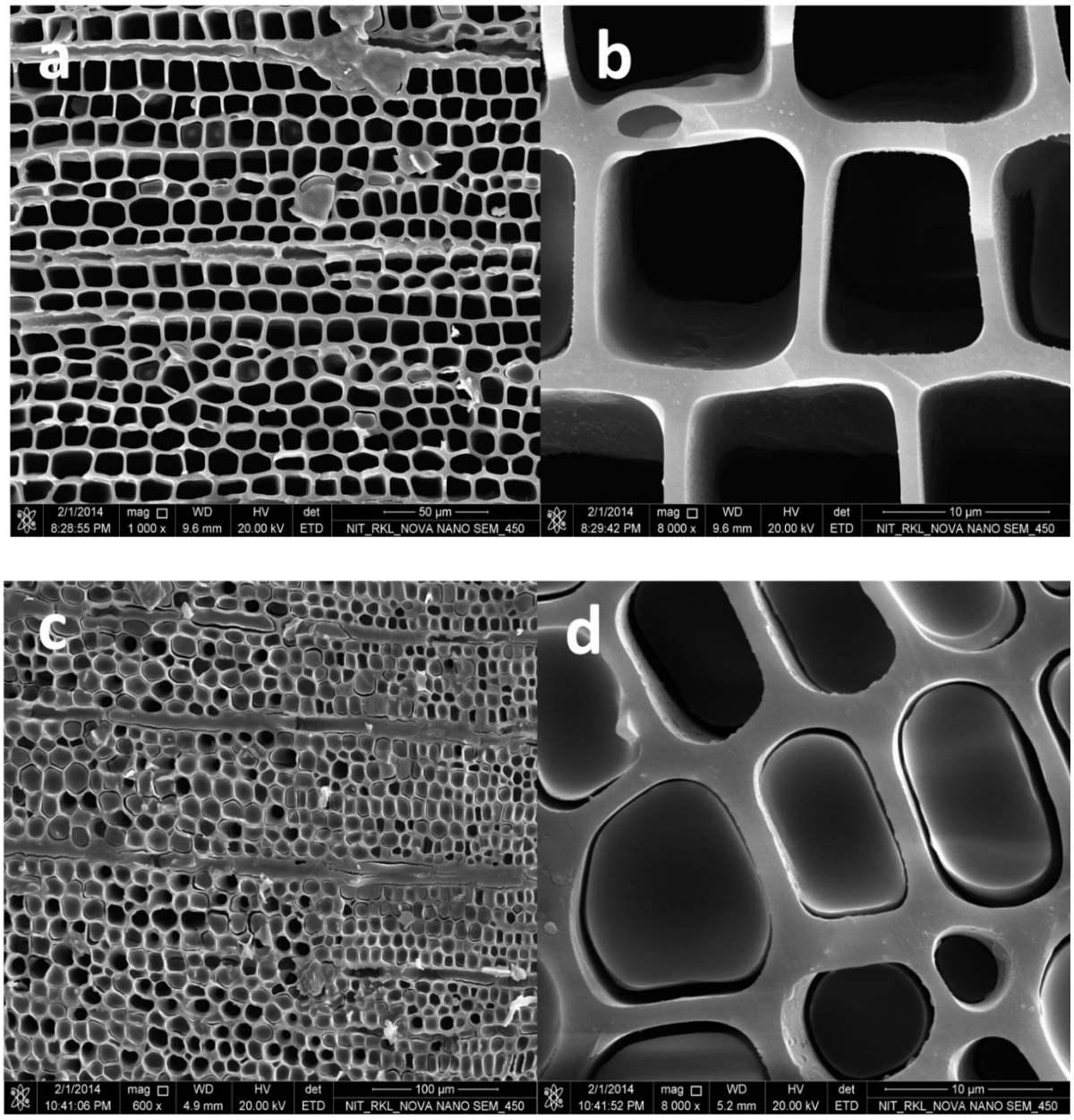

Figure S2: Microstructure of the SiCo ceramics pyrolyzed at 900 ^{o}C; (a, b) infiltrated once with the preceramic polymers, (c, d) samples with 5 infiltration cycles.

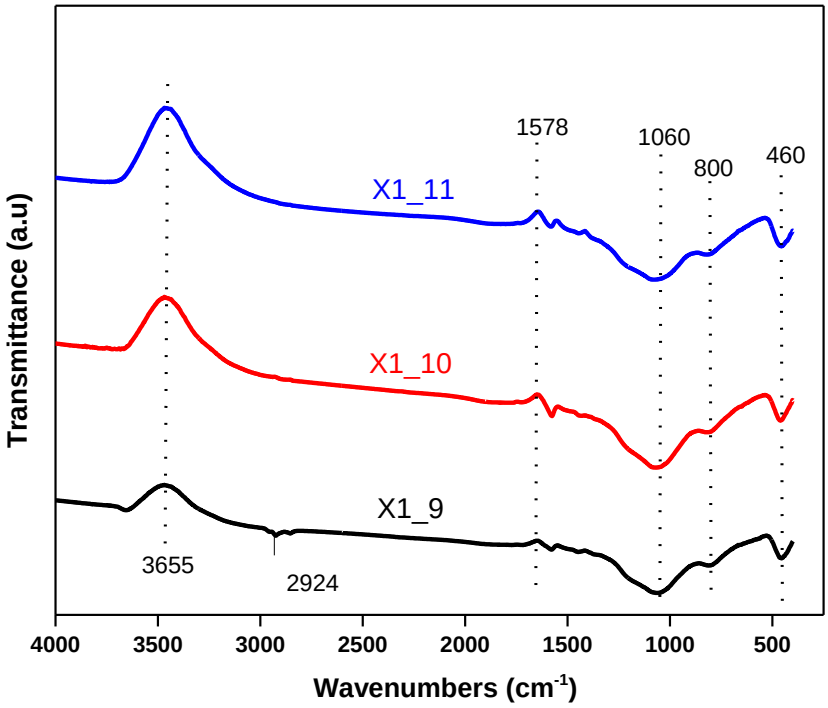

Figure S3: FTIR spectra for X1 pyrolysed at different pyrolysis temperature (900-1100 °C)

Figure S3 represents the FTIR spectra of X1 samples pyrolysed at 900, 1000, and 1100 ^{o}C. All of the spectra are characterized by the presence of hydroxyl group (-OH) in the wavenumber range 3650-3690 cm^{-1}.[1] Small conjugated stretching bonds of -C=O are also observed in all spectra around 1576 cm^{-1}. The absorption bands in the region of 1060 cm^{-1} obtained in X1_9, X1_10, and X1_11 are assigned to the transverse optical (TO) modes of the Si-O-Si asymmetric bond stretching vibrations.[2] The absorption bands at about 810 cm^{-1} obtained in X1_9, X1_10, and X1_11 samples are assigned to the symmetric bond stretching of Si-O-Si bonds. Similarly the absorption bands at about 460 cm^{-1} in all of the samples are associated with the network Si-O-Si bending vibration. In addition, the absorption bands in the regions 1060 and 800 cm^{-1} region are slightly broader, due to the occurrence of some mixed bonds involving C and O.[3] These features are consistent with the formation of silicon oxycarbide amorphous ceramics.

1. W. R. Busing, *The Journal of Chemical Physics*, 1955, **23**, 933-936.
2. M. Nogami, *J Non-Cryst Solids*, 1985, **69**, 415-423.

3. T. Oh, *B Korean Chem Soc*, 2009, **30**, 467-470.

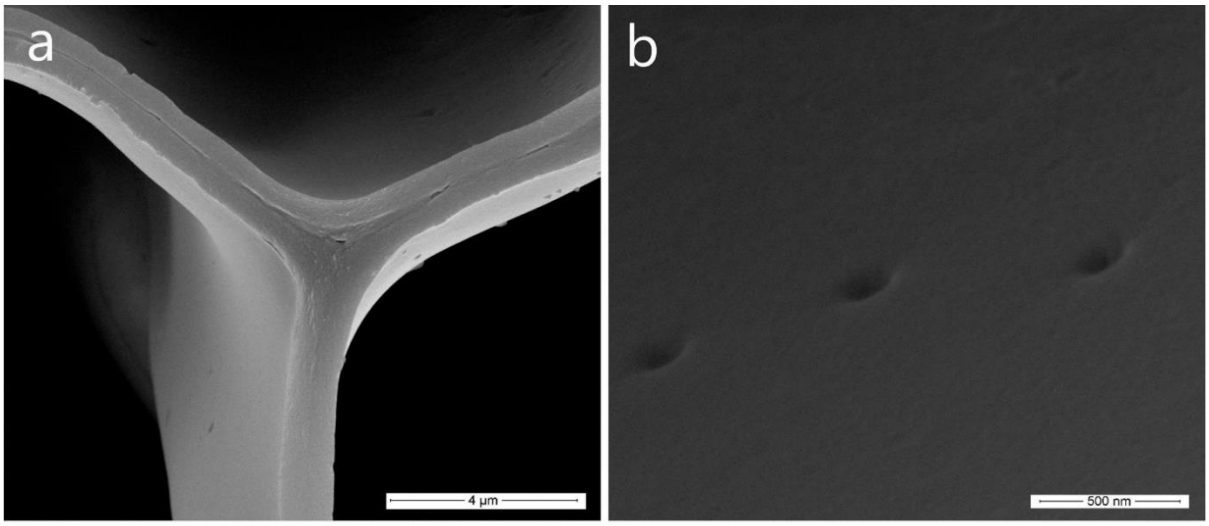

Figure S4: (a) Strut details of X1 sample pyrolyzed at 900 ^{o}C, (b) Strut interior