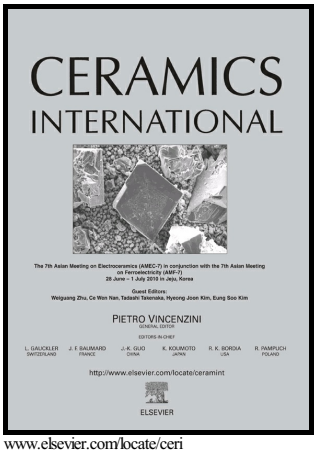

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POLYMER DERIVED SiC ENVIRONMENTAL BARRIER COATINGS WITH SUPERWETTING PROPERTIES

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Abstract

Surfaces with superwetting capabilities can be used for corrosion protection, self-cleaning and bio-fouling protection amongst other applications. In this work, we present a method to produce a SiC coating with an almost superhydrophobic behavior exhibiting water contact angles of 145 ± 3°. Ceramic coatings were produced by the pyrolysis of polycarbosilane as a preceramic precursor of SiC. Aluminum and carbon powders were used as active and passive fillers to compensate for the volume shrinkage of polycarbosilane during pyrolysis. The effects of particle size (Al particles ranging from 0.8 to 10 μm) and concentration (10 to 30% wt.) C and Al of both fillers were studied to produce defect-free ceramic coatings. We have observed that the fillers used not only affected the microstructure but also the surface roughness. We show that the addition of carbon fillers can increase the water contact angle of the ceramic from 42° up to 141°. The combination of carbon and aluminum fillers resulted in water contact angles up to 145°.

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