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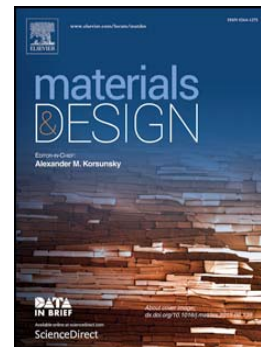
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Preparation of silicon nitride foam with three-dimensional interconnected pore structureLiuyan Yin^{*}, Xingui Zhou, Jinshan Yu, Honglei Wang

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Abstract: Silicon nitride (Si_3N_4) foams with three dimensional (3D) interconnected pore structure were prepared by a combination of protein foaming method and sacrificial template method. Hydrophobic epoxy resin (EP) particles were used as the sacrificial template. The hydrophobic character of EP particles enabled them to absorb on to the air-water interface in the foamed slurry, resulting in the formation of windows on the cell walls after the burn out of EP particles. Pore structures and properties of the Si_3N_4 foams fabricated with adding different amount of EP powder and different sintering temperature were investigated. It was indicated that the Si_3N_4 foam fabricated without EP powder exhibited catastrophic failure during the compression test, whereas the Si_3N_4 foams fabricated with EP powder did not. Moreover, the Si_3N_4 foams with large numbers of windows on the cell walls exhibited higher compressive strength than the Si_3N_4 foam without window on its cell walls, even though the open porosities of the former were similar to the latter or even higher than the latter.

Keywords: Protein foaming; Silicon Nitride; Ceramic foam; Sacrificial template; Hydrophobic epoxy resin

1. Introduction

Si_3N_4 foams have gained more and more attentions for artificial bone application because of their

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