

26th October 2018

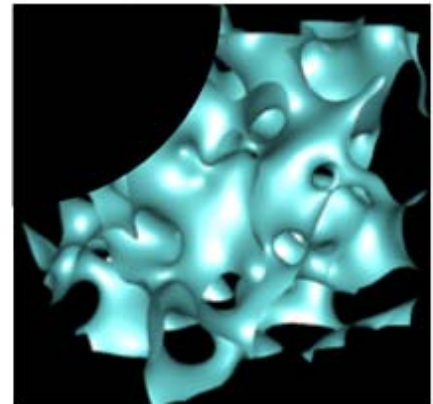
A Review of the Effects of a Bicontinuous Structure on a Material's Properties

Seba Pereira, Nathan Beets, Sean Corcoran

MSE Virginia Tech

Abstract

A bicontinuous structure can have several different effects on a material's properties. The bicontinuous morphology for a titanium-magnesium composite will affect its mechanical properties. The composite is fabricated by powder titanium and its continuously sintered necks and ultrasonic infiltration by liquid magnesium distributed through its interconnecting pores. The results exhibited a lower young's modulus and high compressive and bending strength which is suitable for biomedical materials. For a nanoporous silver thin film, its electrochemical properties are affected, making it a superior candidate as an electrocatalyst for a hydrogen peroxide detection sensor. This can be fabricated by electrodeposition of silver tin onto a wire nickel substrate then using selective corrosion to dealloy the tin leaving a continuous nanoporous silver structure. The results exhibited a wider detection range, a faster response time, and an anti-interference ability.



Morphology of the bicontinuous Allen-Cahn structure (Phase-field method)

Biography

Seba Pereira is completing a Master of Engineering, in Dr. Corcoran's group, working directly with Mr. Nathan Beets, through the accelerated program here in the MSE Department at Virginia Tech. His undergraduate studies are in materials science and engineering. This is his second semester and he is planning on graduating this December. After graduation, he has accepted a job offer with Lockheed Martin in their missiles and fire control division.

