

Harnessing Design Principles from Glass Sponges for Engineering Applications

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2017 NEW.Mech

Abstract:

The hexactinellid sponge *Euplectella aspergillum* (sp.), commonly known as the "Venus' flower basket", has recently attracted increasing attention because of its intricate and regular, cylindrical cage-like structure. This sponge is primarily made of 'brittle silica' and therefore buckling strength plays crucial role in making it resistant to impacts and environmentally applied stresses. We show through a combination of numerical analysis and experiments that a sponge-inspired double diagonal reinforcement design provides enhanced buckling resistance.