Inspirational multiscale biological composites

The biological world is replete with composite structures of various kinds, which could be teaching us important lessons in terms of assemblies sophistication and ensuing mechanical property optimization. For example, in nature high toughness is generally provided by means of multiscale (from nano to macro) fibrous composites, rather than with composite structures at a single scale. This will be illustrated by means of examples taken from our recent research with synthetic layered structures based on the turtle carapace [1,2], sponge spicules [3,4], and tendon-like multiscale unidirectional structures [5-8].