Abstract Submitted
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Soaring to New Heights in Natural Materials[1] SARA BODDE, JAMES KIANG, JOANNA MCKITTRICK, University of California, San Diego — Feathers are the most distinguishable feature of all modern Aves. Flight feathers exemplify several materials science phenomena. The most obvious attribute is the branching or hierarchical structure at macroscale to mesoscale. The primary shaft, or rachis from which secondary features project, of the flight feather is a sandwich structured composite. The thin brittle cortex of the rachis and barbules encloses a relatively thick, low-density medullary core or cellular solid. The cortex of the rachis is constructed as a fiber-reinforcement composite, and structural variations along the length of the feather invoke the comparison to functionally graded materials. We have studied microstructure and mechanical properties of the feather rachis in a piecewise fashion, and we will present results of investigations of the mechanical behavior and failure of the composite and parts thereof in tension, compression, and flexure.

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