

◆ 报告人 ◆ Prof. David Kisailus

University of California, Riverside, USA

◆ 报告题目 ◆ High Performance Impact-Tolerant and Abrasion-Resistant Materials: Lessons from Nature

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◆ 报告地点 ◆ 中科院过程所东区主楼 301 会议室



High Performance Impact-Tolerant and Abrasion-Resistant Materials: Lessons from Nature

Our analyses of the ultrastructural and mechanical properties of mineralized biological materials have demonstrated some architectural features that help explain their observed damage tolerance. One such example is found in the mineralized and abrasion resistant teeth of chitons, a group of marine mollusks who erode away rocky substrates on which they graze. We describe the architectural and mechanical properties of the radular teeth from *Cryptochiton stelleri* using modern microscopy and nanomechanical characterization techniques. The unique multi-phasic design of these materials contributes to their functionality and highlights some interesting design principles that might be applied to the fabrication of synthetic composites.

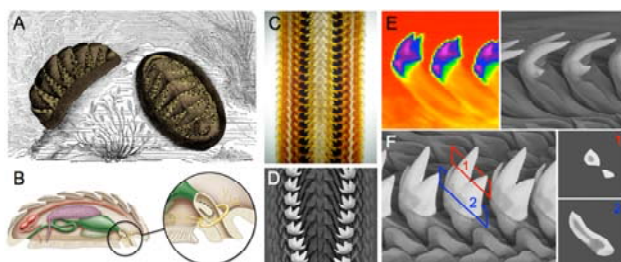


Figure 1: Morphological features of the chiton radula. External (A) and internal anatomy (B) of a representative chiton showing the location of the radula, a rasping, toothed conveyor belt-like structure used for feeding. Details of the anterior region of the radula from *C. stelleri* (C-F). Optical (C) and backscattered SEM (D) imaging and x-ray transmission studies (E) reveal the electron dense nature of the tricuspid tooth caps. Cross-sectional studies through the mature teeth from *C. stelleri* (F_{1,2}) reveal a concentric biphasic structure.

Prof. David Kisailus, 于 1993 年获得德雷克赛尔大学化学工程学士学位, 1999 年获得佛罗里达大学材料科学与工程硕士, 2002 年获得加州大学圣塔芭芭拉分校材料科学博士学位, 现任美国加州大学河滨分校教授, 在仿生材料合成, 生物矿化, 陶瓷加工, 薄膜生长, 纳米材料, 能源储存和转换材料 (燃料电池, 电池) 等领域的研究处于世界领先水平。目前致力于生物的半导体材料, 生物矿物的形成酶催化合成仿生示范, 纳米粒子合成与自组装前体的合成。大卫教授现已在 PNAS、J. Am. Chem. Soc.、Angewandte Chemie-International Edition、Adv. Mat.、J. Structural Biology 等诸多高水平国际杂志上发表大量论文。在本次报告中, 大卫教授将详细介绍他的研究小组取得的最新研究。

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◆ 联系人 ◆ 王丹, 电话: 010-62533616, Email: danwang@home.ipe.ac.cn