ETH zürich

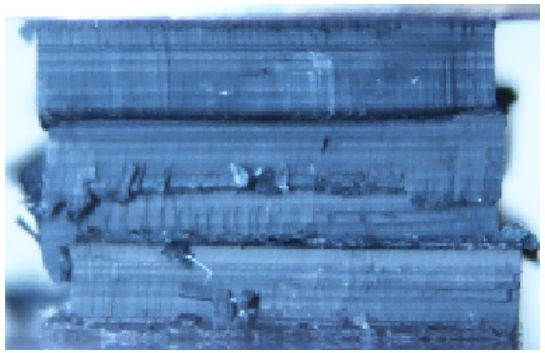
Materiali micro- e nano-strutturati con proprieta' termiche e meccaniche controllabili

Chiara Daraio

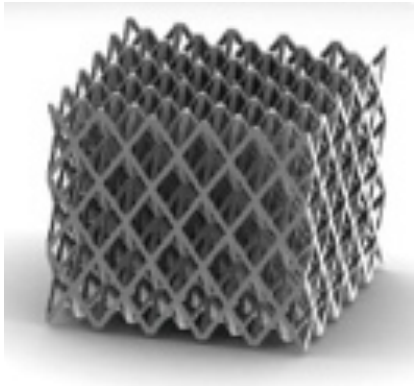
www.mechmat.ethz.ch

Extreme environments

Impact protection

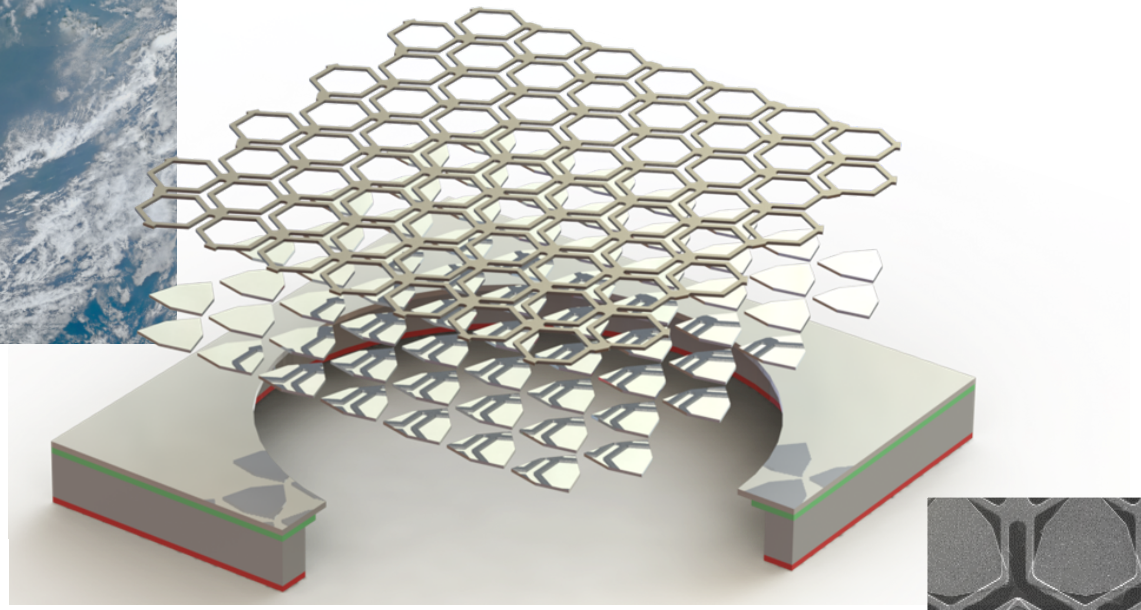


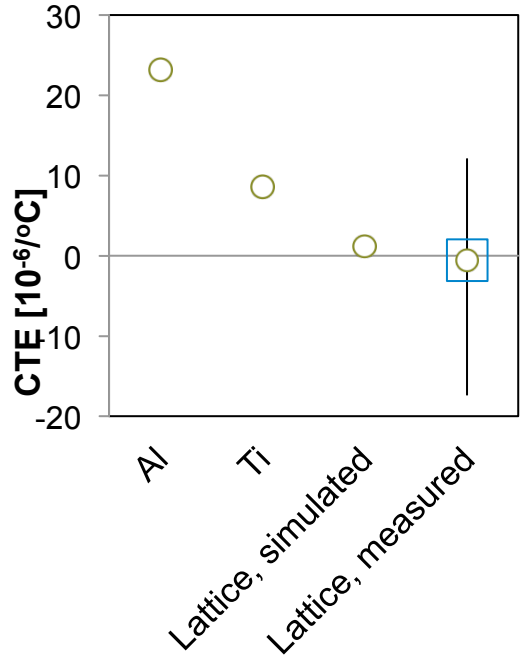
Deformable scaffolds

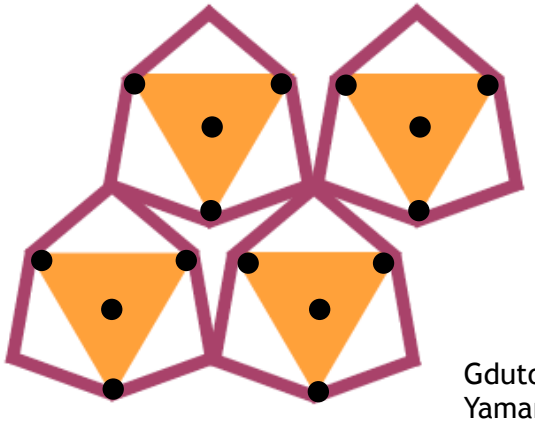


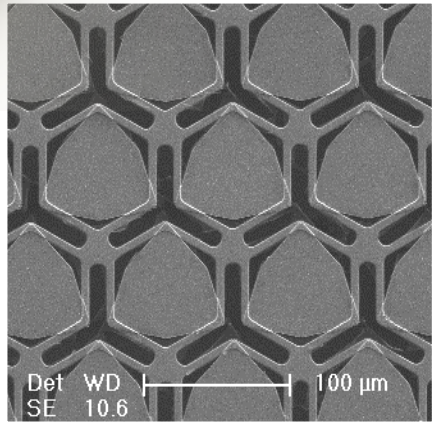
Engineering Areas

Materials for Extreme Environments



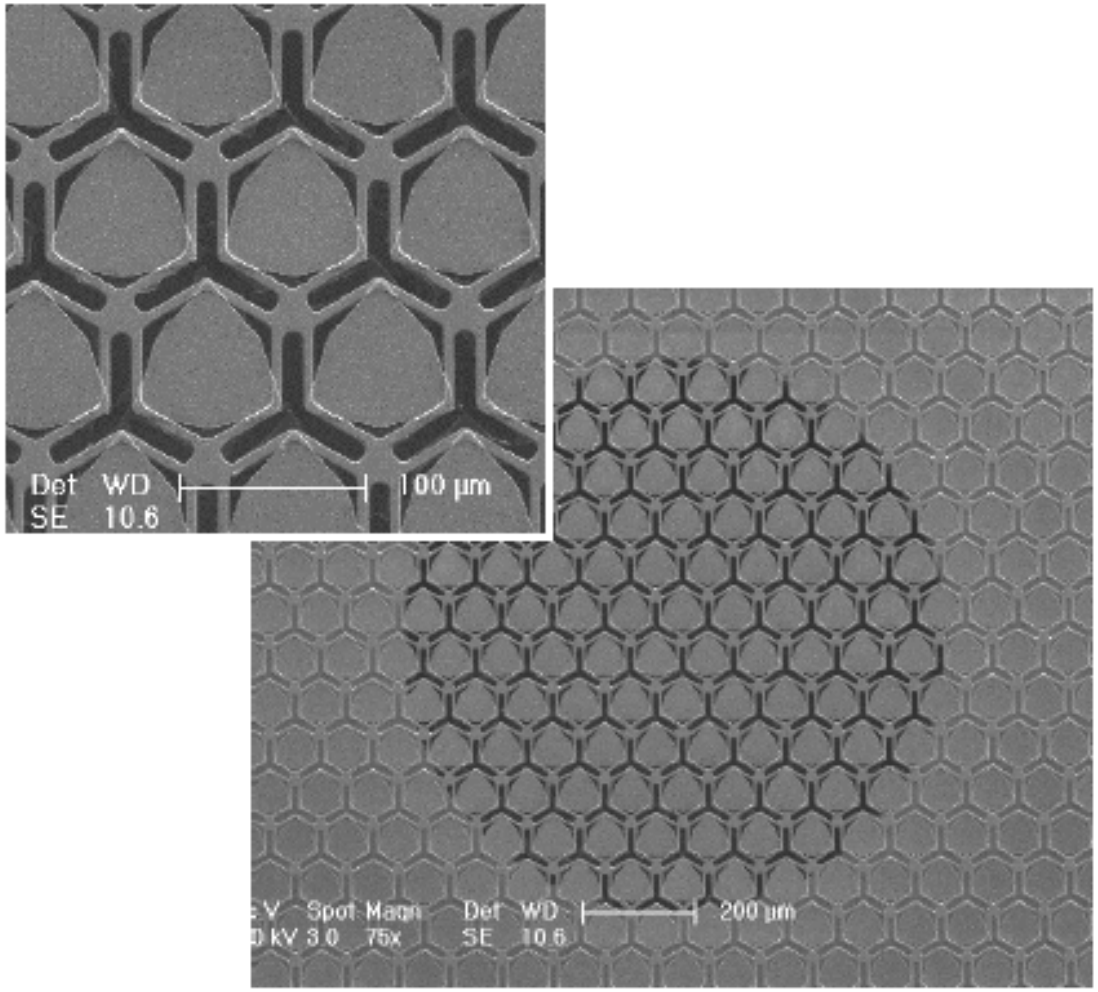


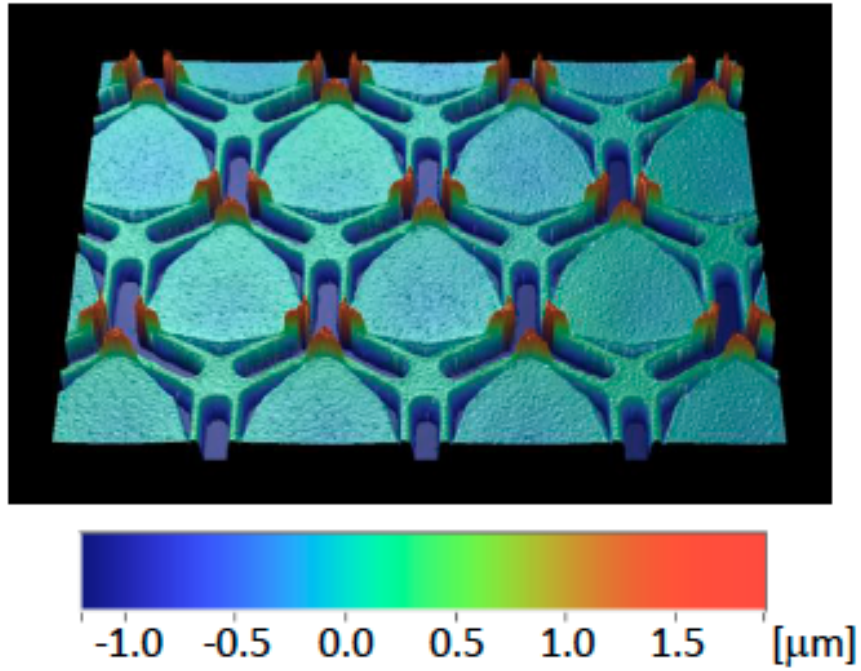




Gdutous et al. Experimental Mechanics, 2013
Yamamoto et al. Submitted 2013

Materials for Extreme Environments: Characterization

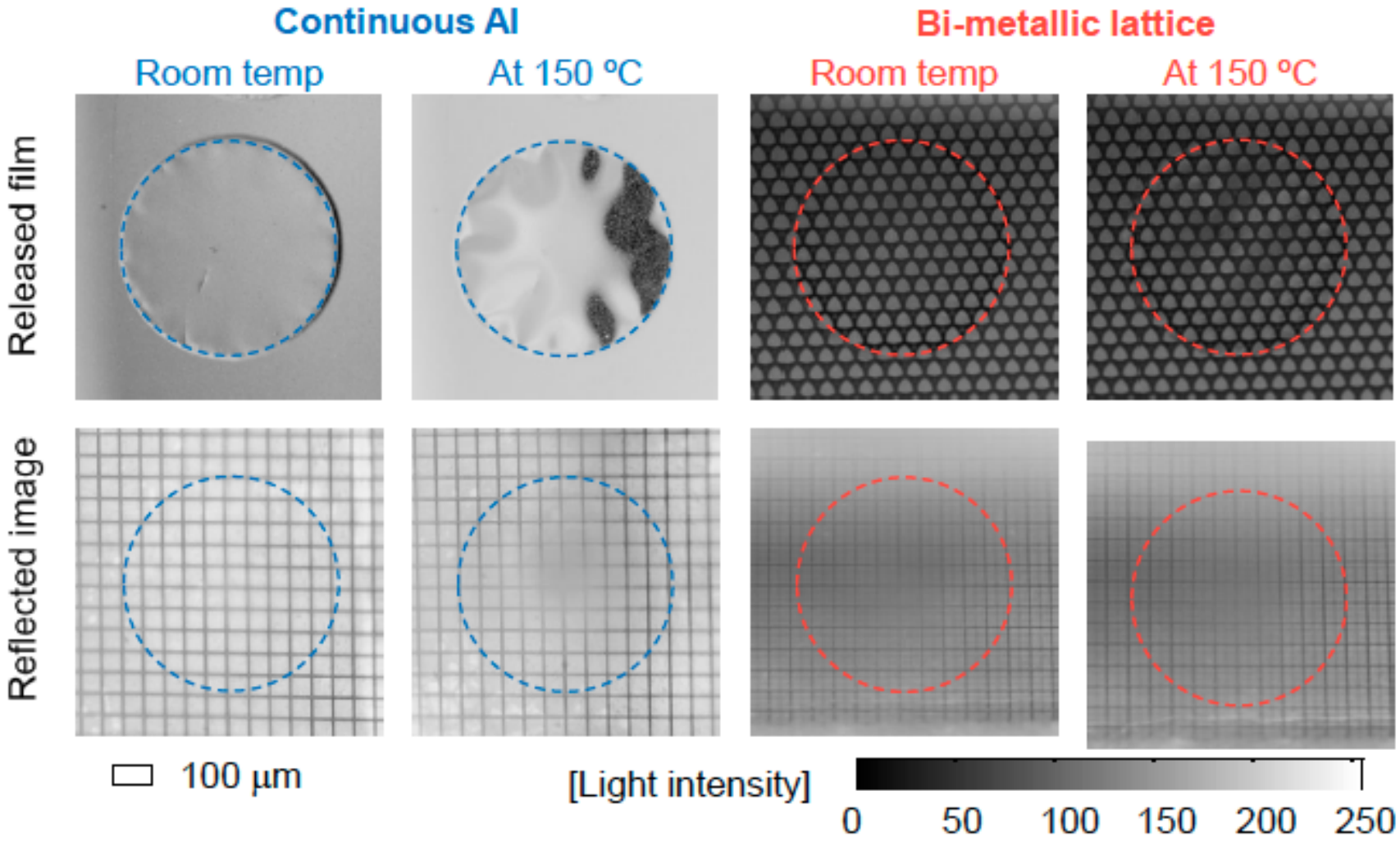




- Released flat: ~0.1-0.2 µm out-of-plane
- High yield > 95%

Yamamoto et al. Submitted 2013

Materials for Extreme Environments: Optical Properties



Linear correlation coefficient:
Al: 0.53
Lattice: 0.89

Yamamoto et al. Submitted 2013

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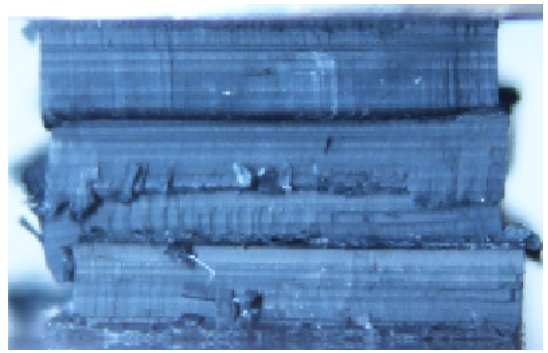
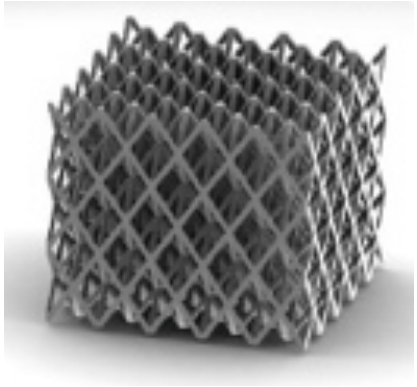


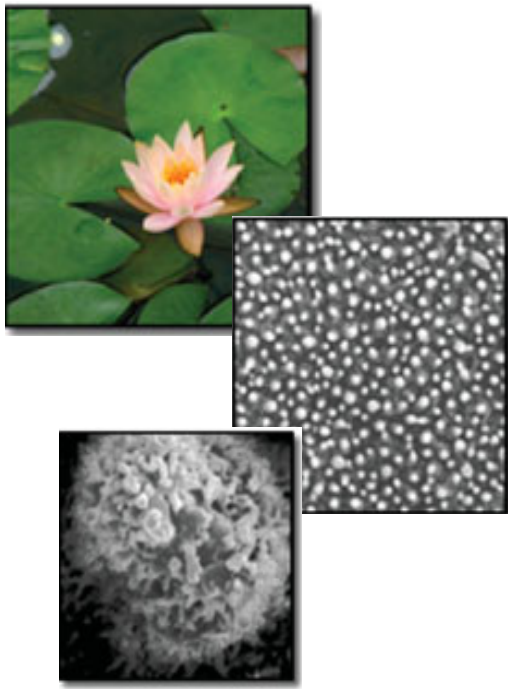
Deformable scaffolds



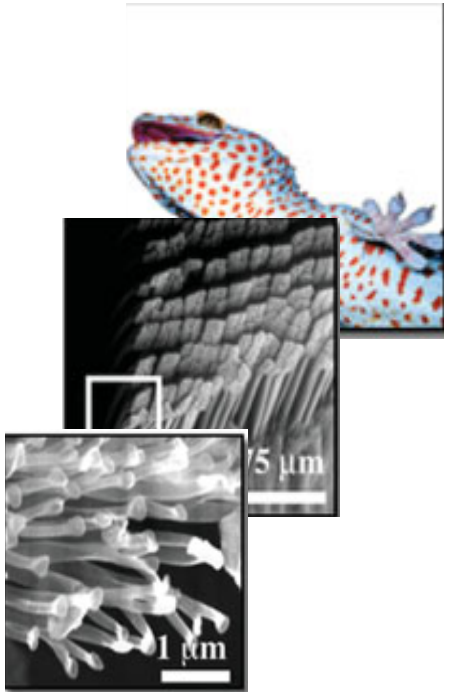
Engineering Areas

Structure/Function Relationship in Materials

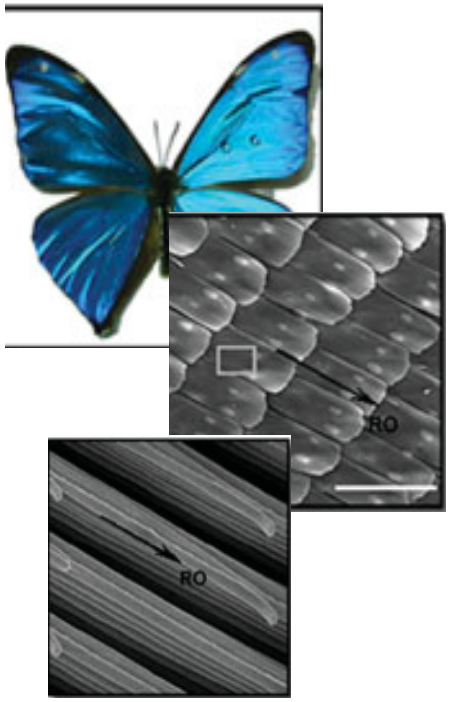
Self-cleaning



Adhesion

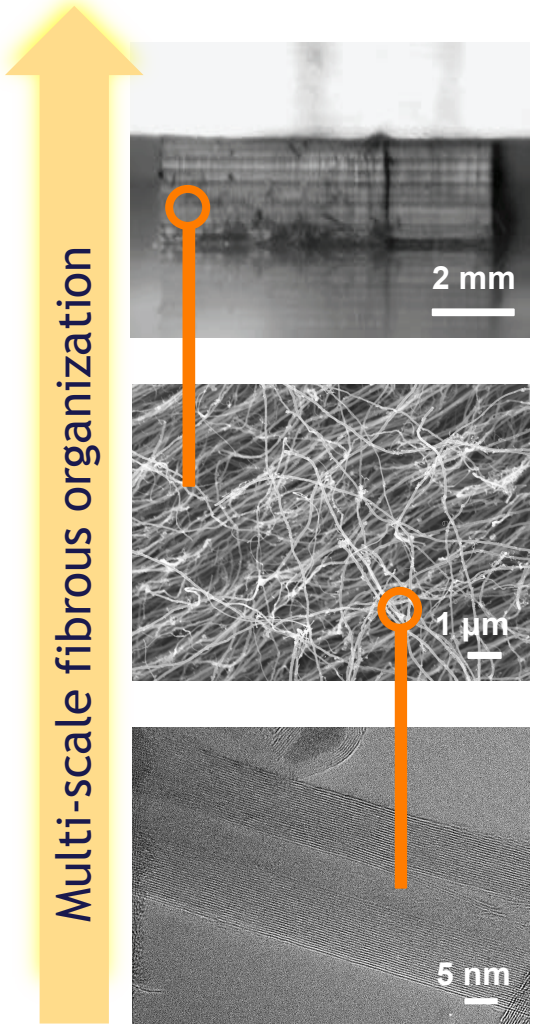


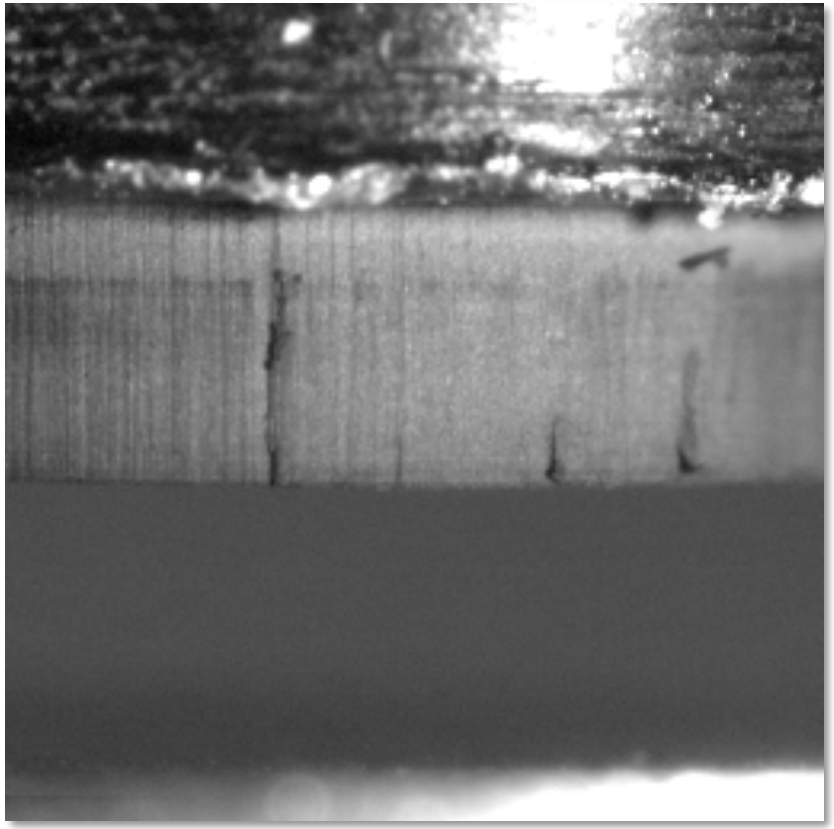
Color



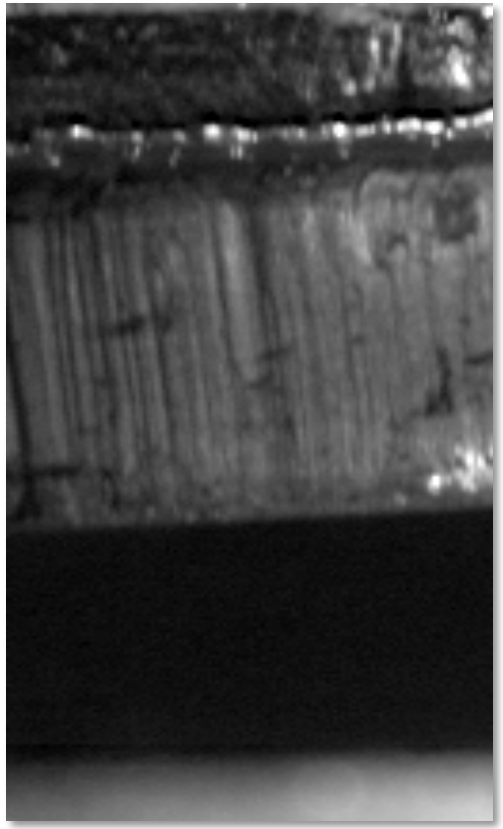
Xia *et al.*, Adv. Mater., 2008

Impact Protection Materials

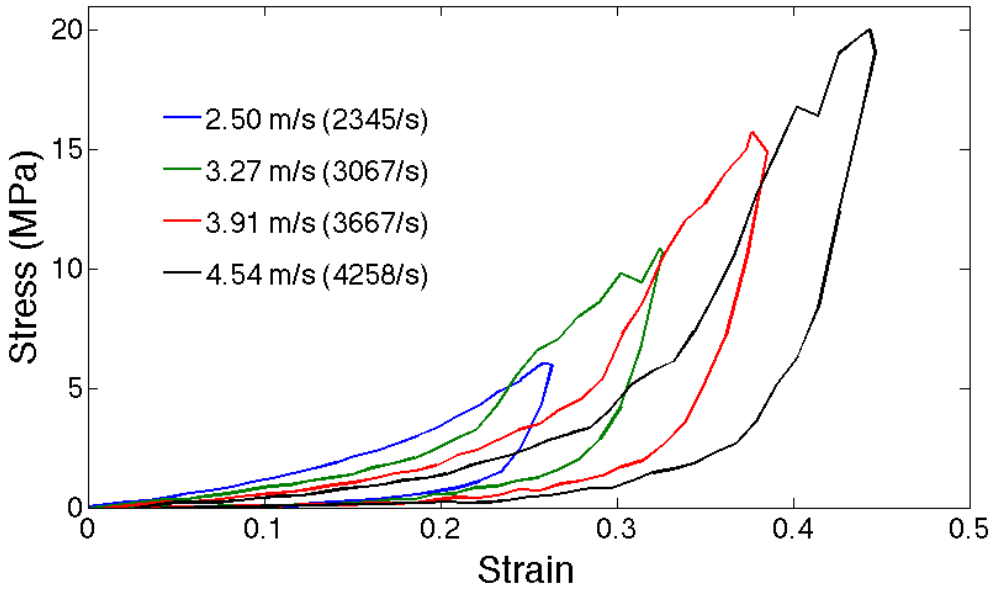


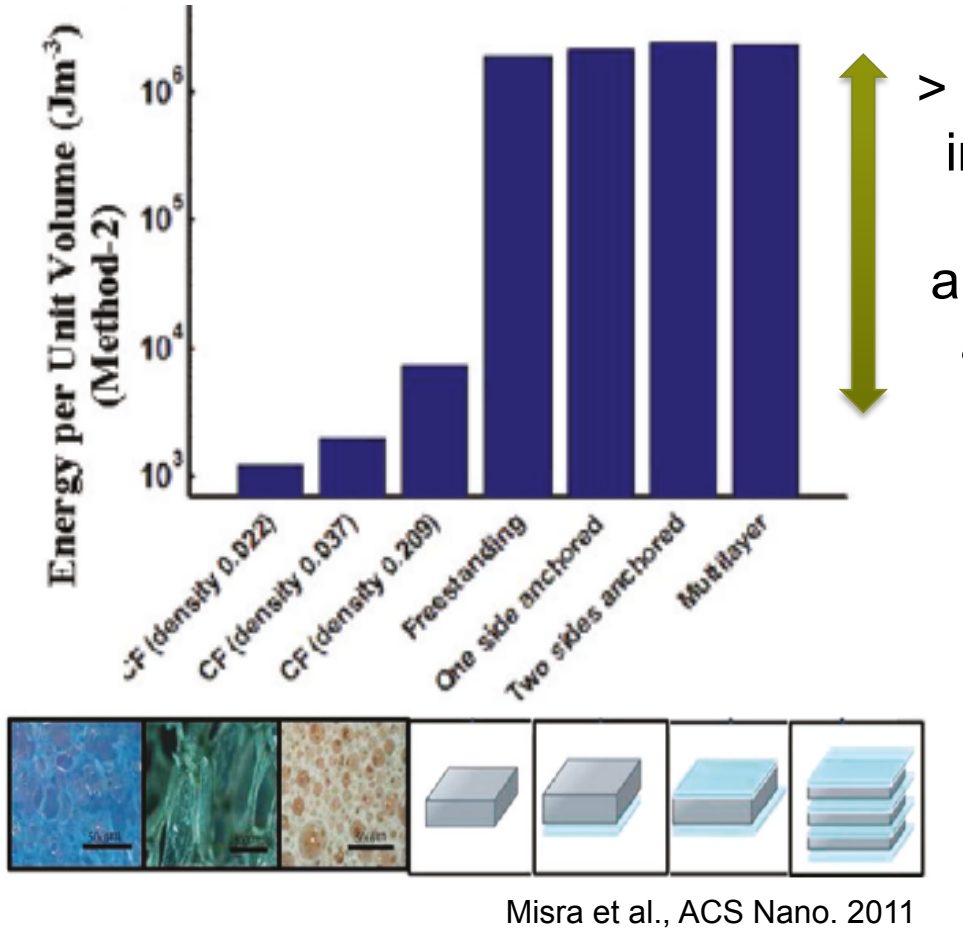


Misra A, et al., Advanced Materials, 2008
Raney JR ,et.al., Carbon, 2011.



Impact Protection Materials





> 200 times improved energy absorption at same density

Misra et al., ACS Nano. 2011

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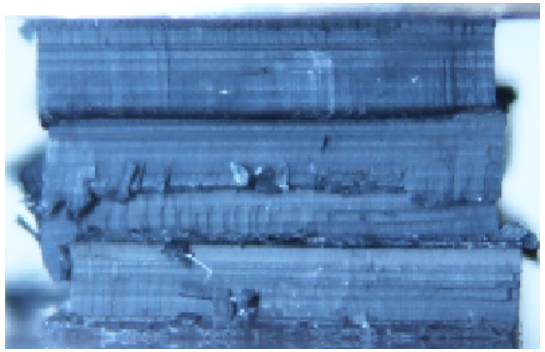
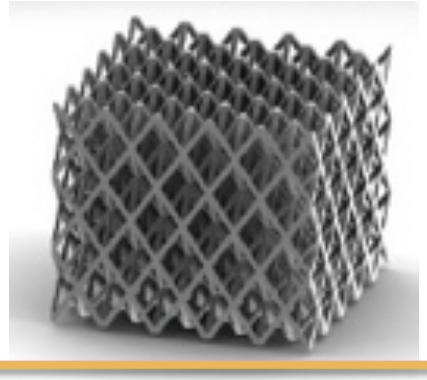
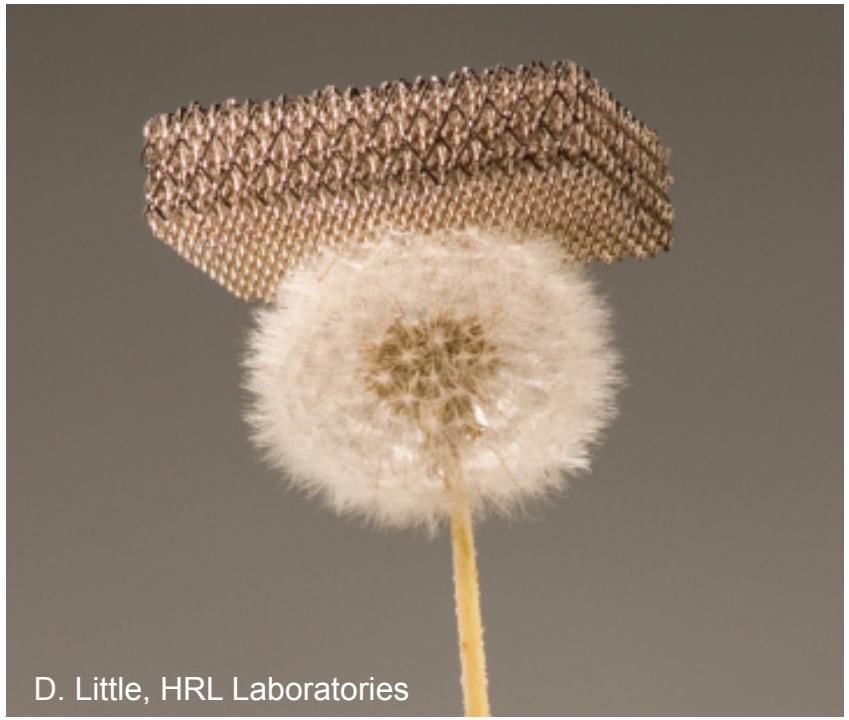


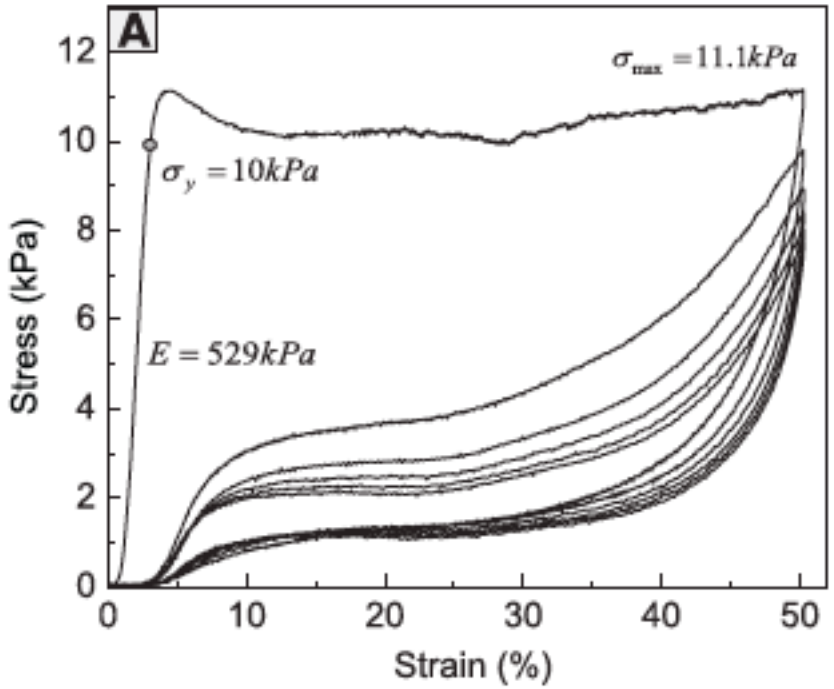
Deformable scaffolds



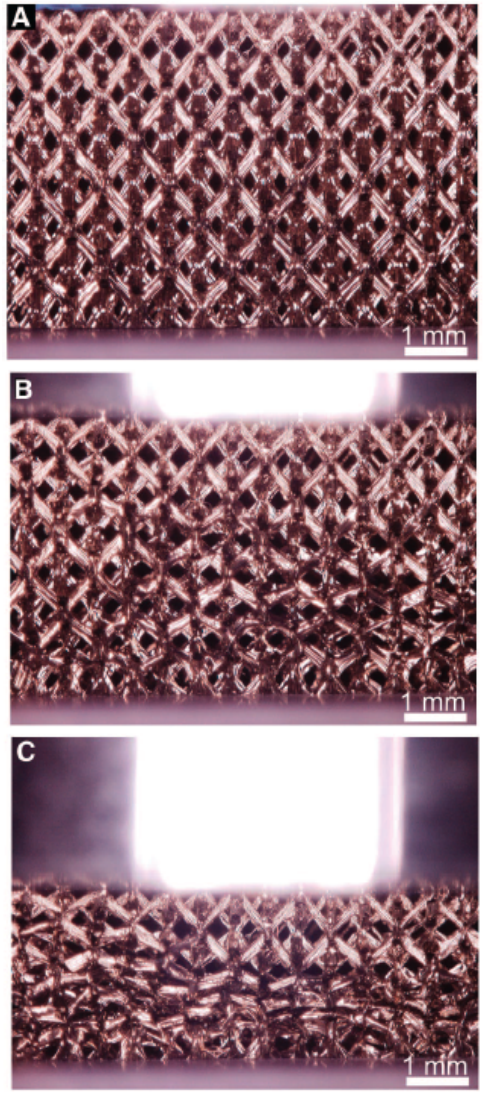
Engineering Areas

Deformable scaffolds





T. A. Schaedler, et al. Science, 2011



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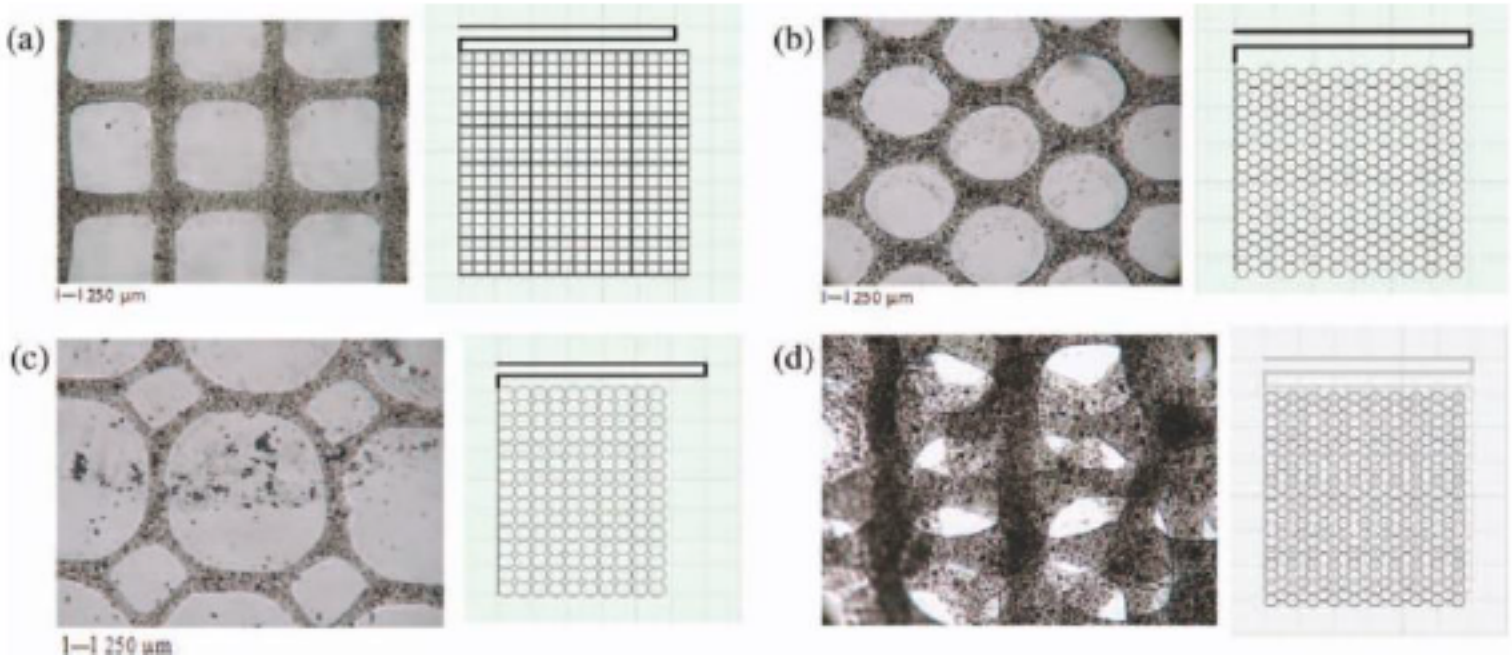

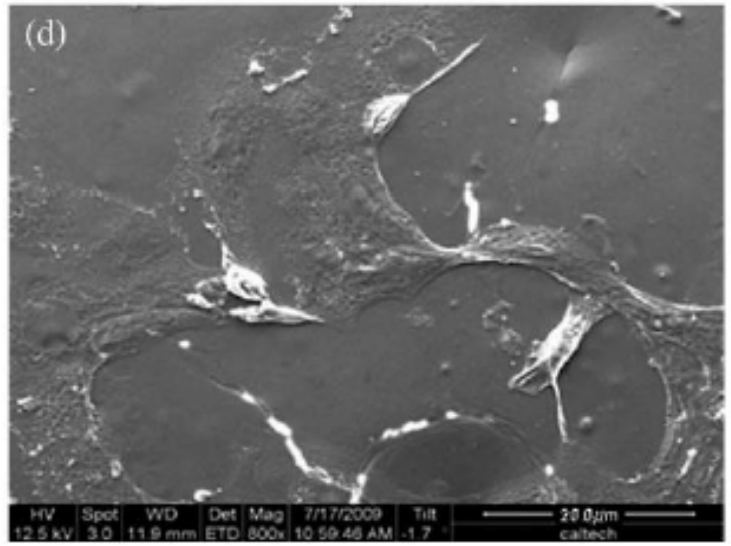

Vozzi et al. Journal of Applied Polymer Science, 2012

Seeking Partnerships to

Develop collaborations

Find applications

Train students

Find solutions to existing industrial problems

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