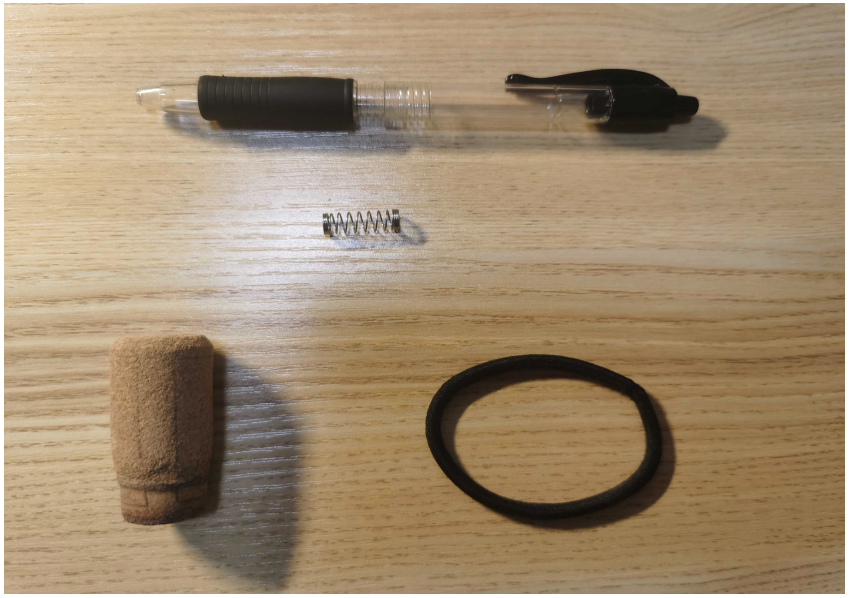
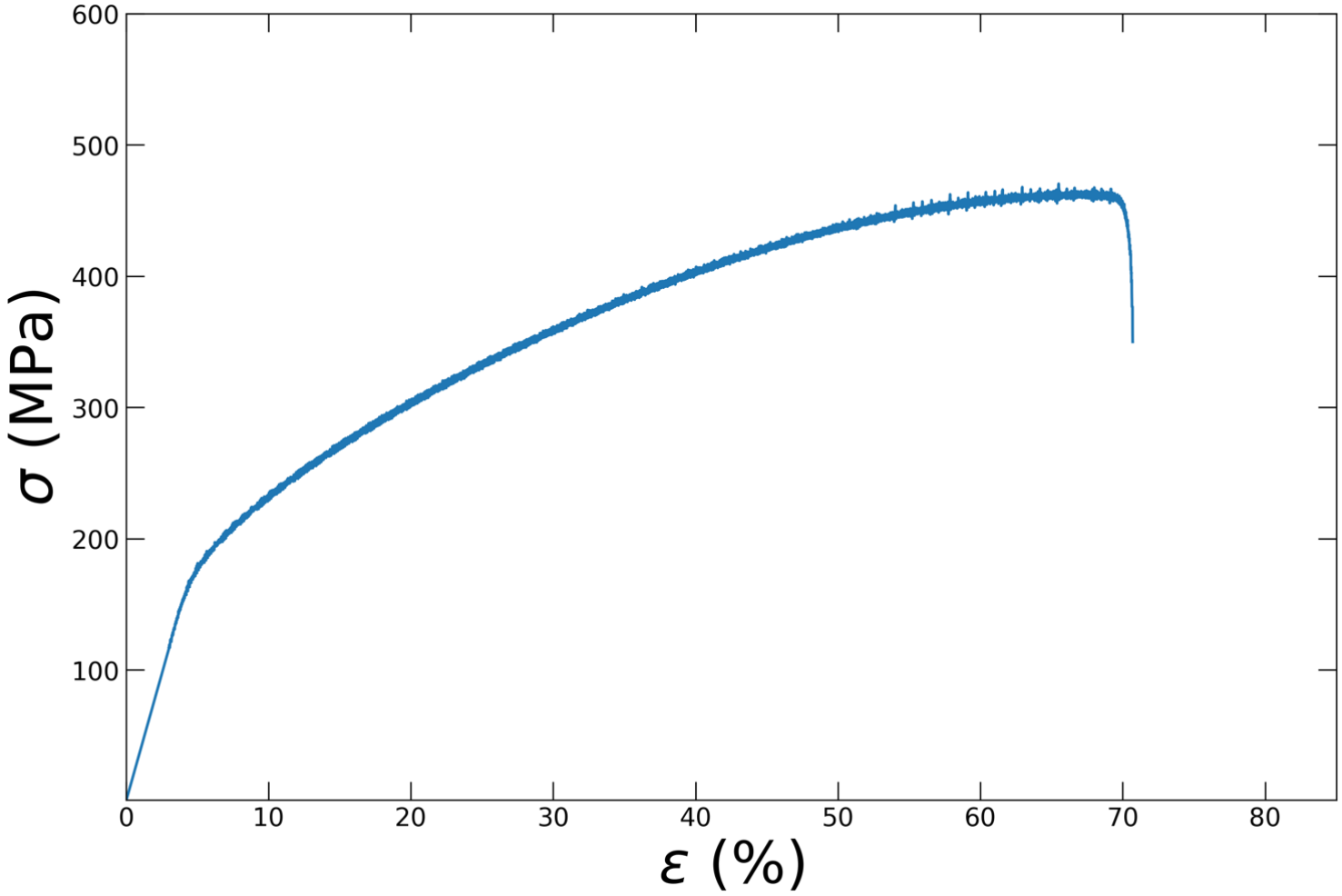
6. 弹性形变的微观与胡克定律

Dongsheng Wen

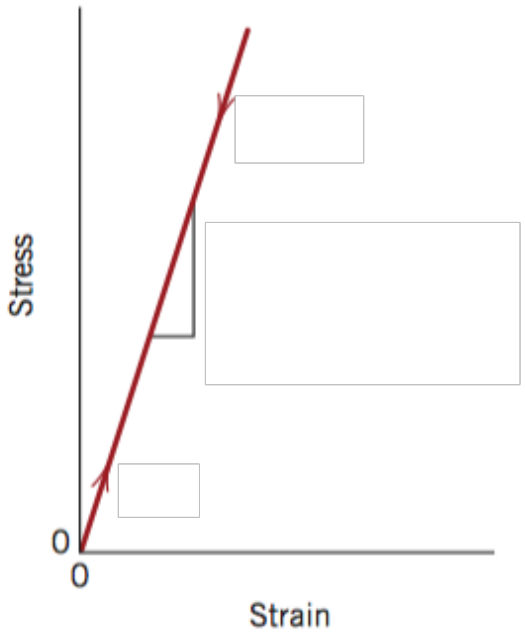
说到弹性形变...



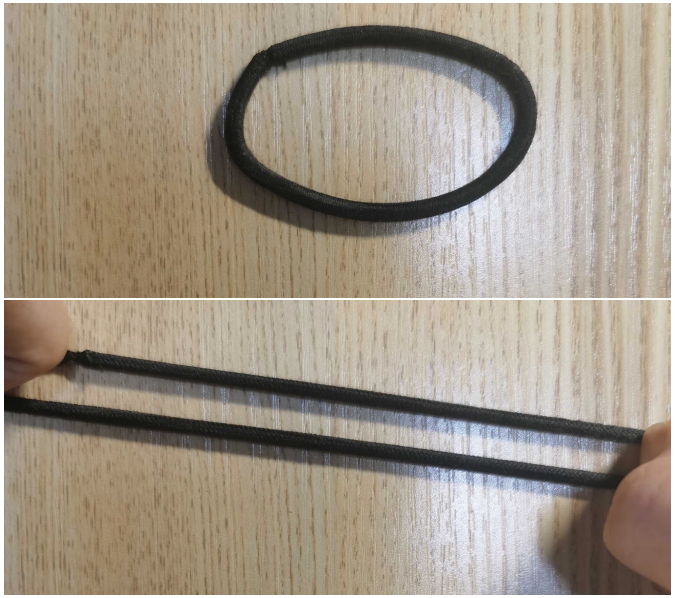
回顾：应力-应变 阶段一：弹性形变

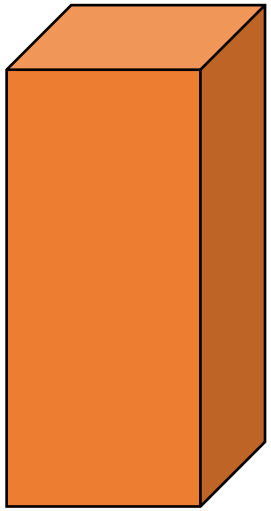


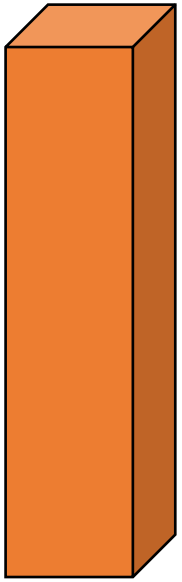
胡克定律 (Hooke's Law)



泊松比 (Poisson’s ratio)

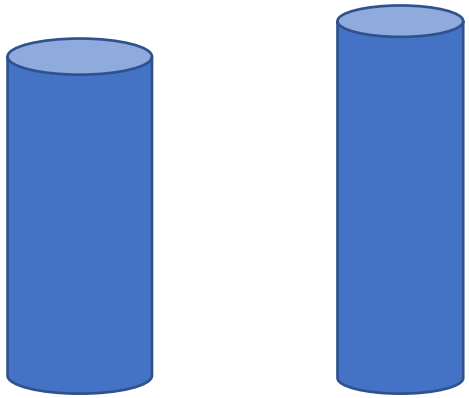




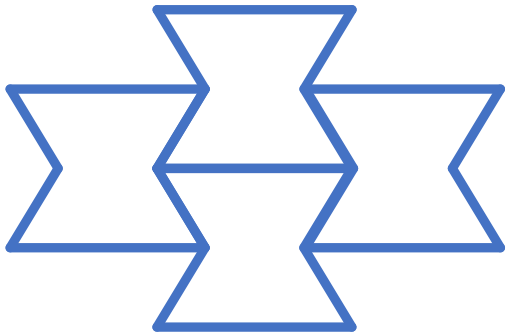


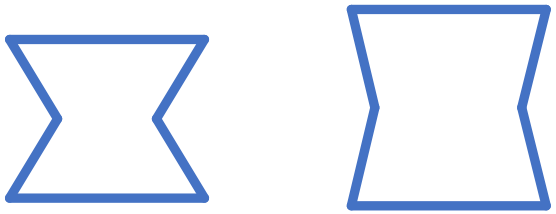
小练习：正方向应力和侧方向应变

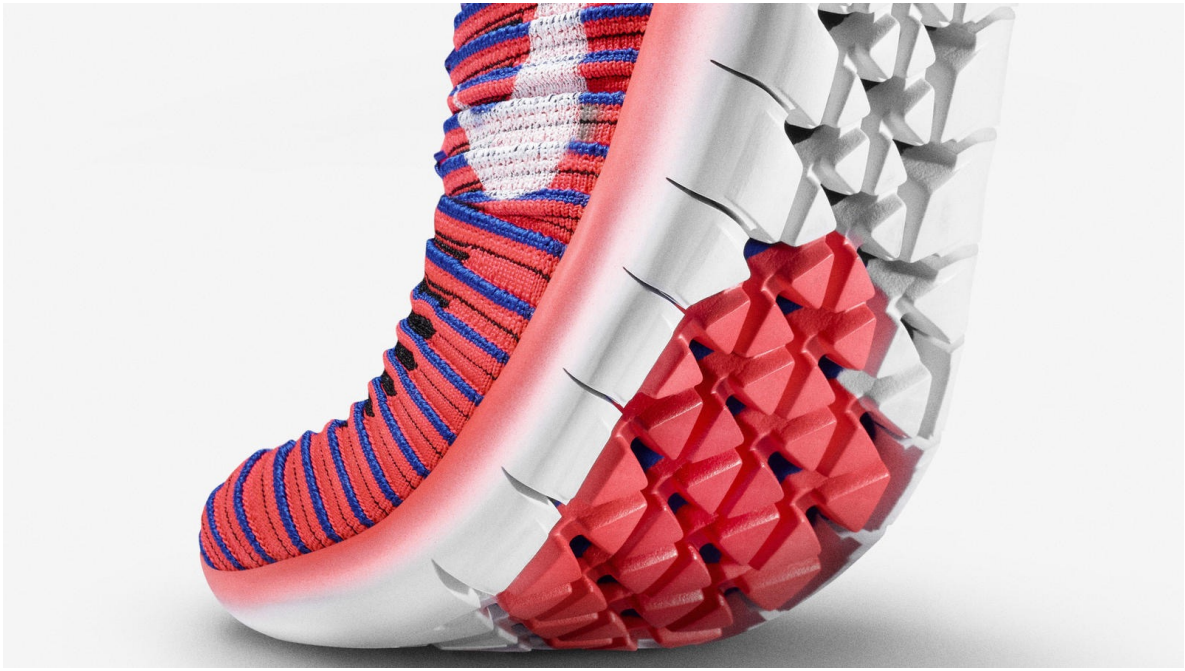
- 一根黄铜棒(直径=10mm) 在沿着长度方向受拉， 测到直径减少了0.0025mm。这时候施加的应力是多少？
- 黄铜性能：E=97GPa， v=0.34

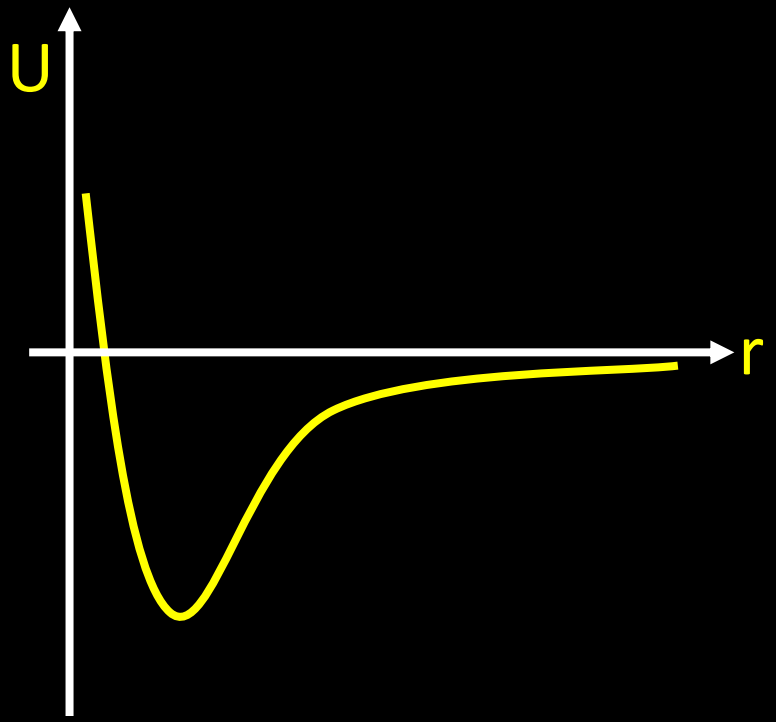


负的泊松比？！

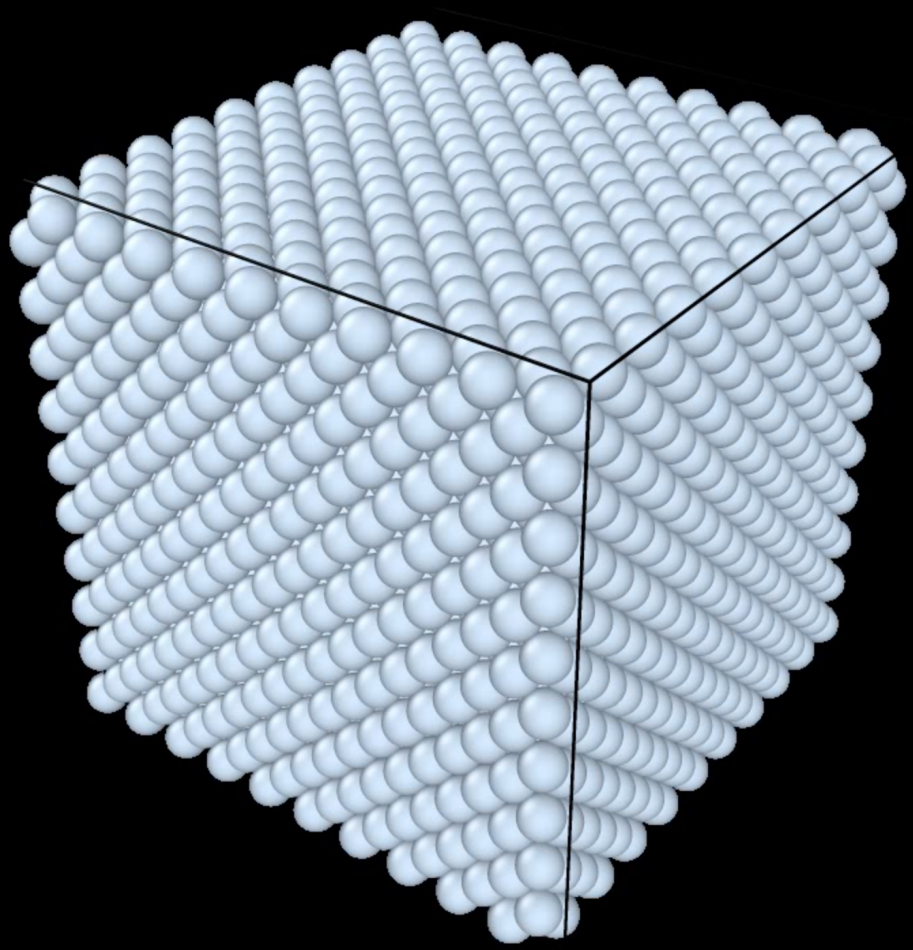


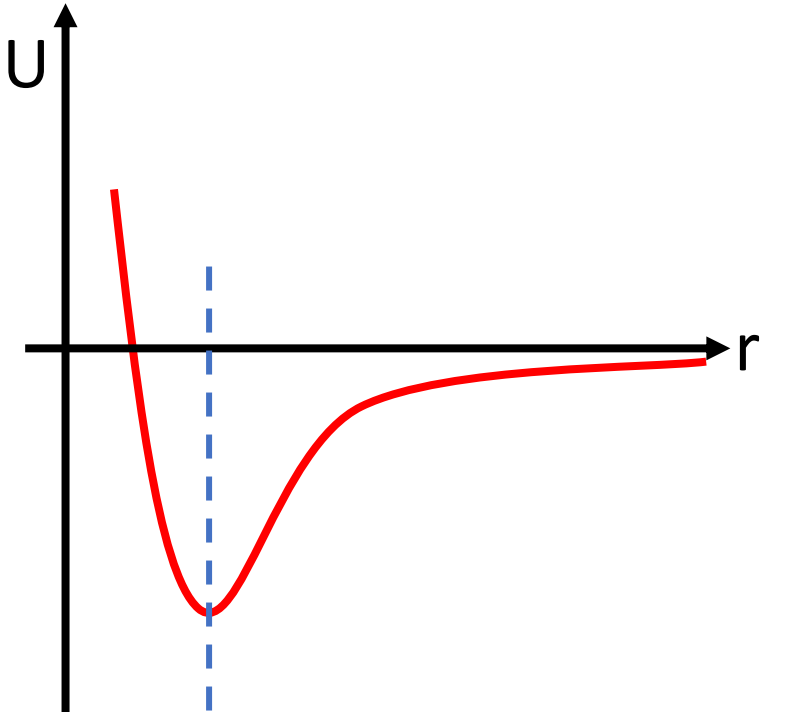


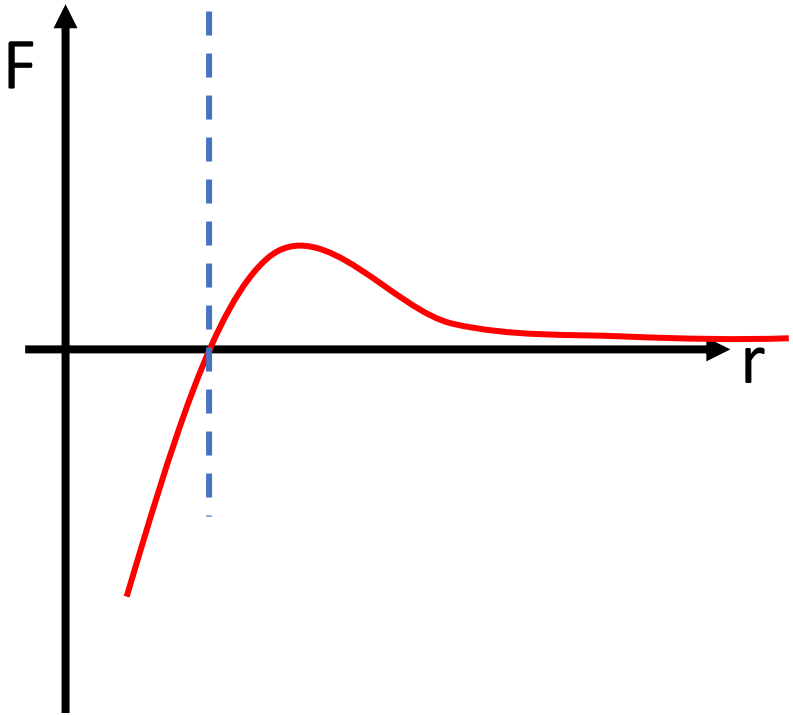




微观下的弹性形变



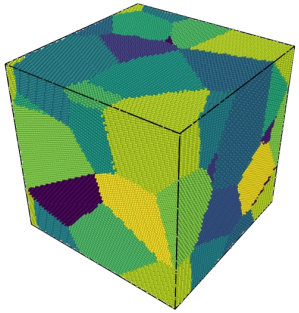


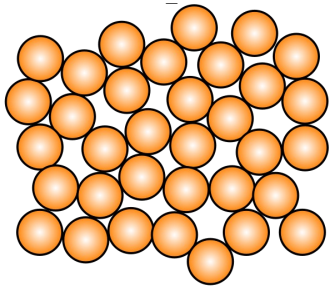


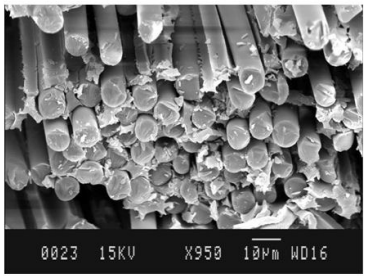
微观下的弹性形变

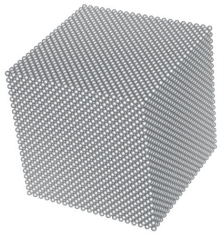
各向同性 (isotropic)与各向异性 (anisotropic)

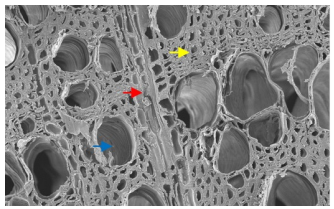
各向同性 (isotropic)与各向异性 (anisotropic)

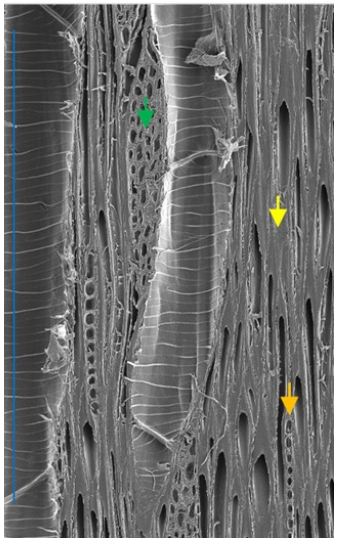








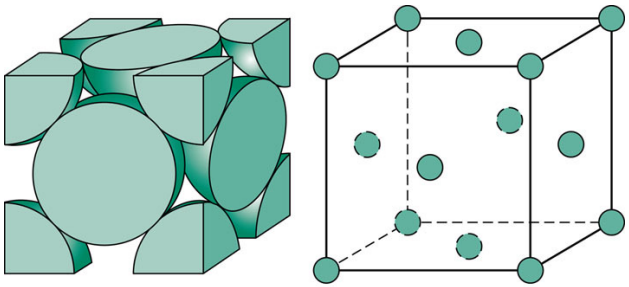


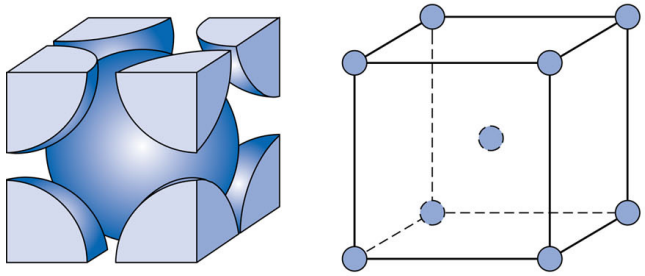


https://brettdiehl.weebly.com/wood-anatomy.html

https://ecm-academics.plymouth.ac.uk/jsummerscales/mats347/characterisation.htm

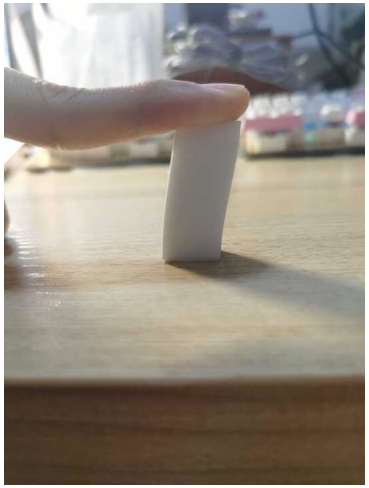
例子：FCC/BCC的各向异性

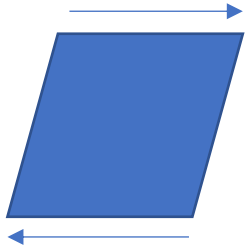




[100] [110] [111]

剪切力的弹性形变





$$\tau = G\gamma$$

7. 塑性变形与位错

dswen94