材料的力学性能

5.力学性能测试，应力/应变

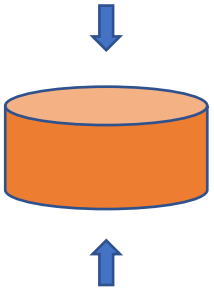
Dongsheng Wen

结构材料——用来承受力的材料

Structural materials

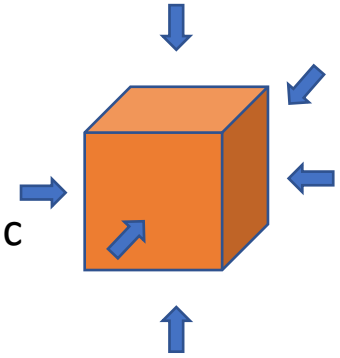
四种常见的。。。

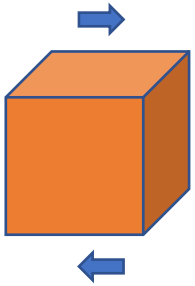
拉力
Tension



压力
Compression

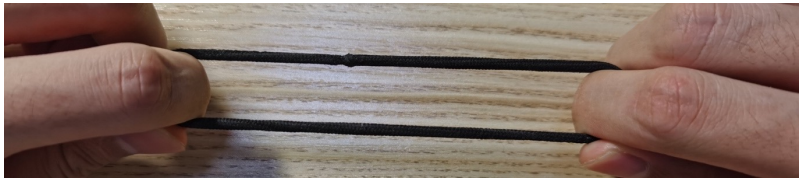
静水压力
Hydrostatic



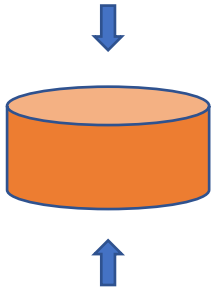


剪切力
Shear

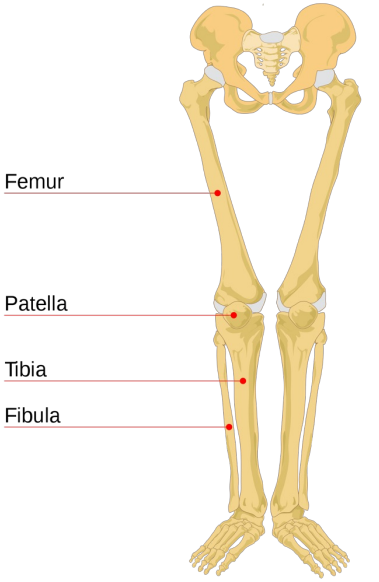
拉伸 (Tension)



压力 (Compression)

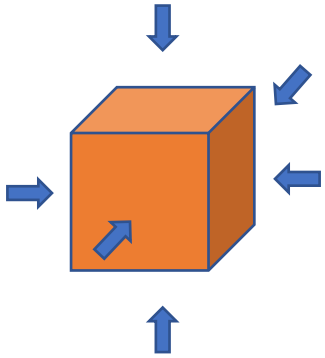


https://m.us.sina.com/gb/china/phoenixtv/2020-05-05/detail-ifzvxrwt2214302.shtml



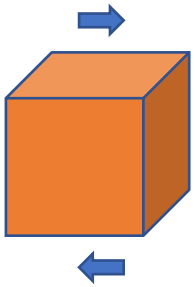
Wikipedia: leg bones

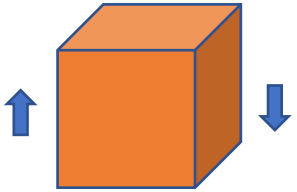
静水压力 (Hydrostatic)

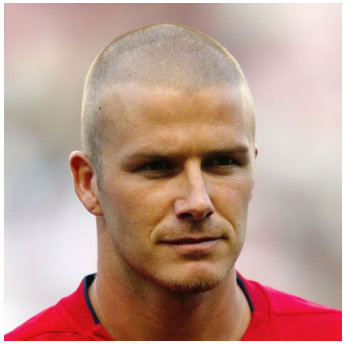


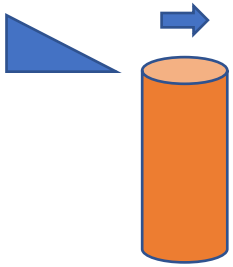
LarvalBot

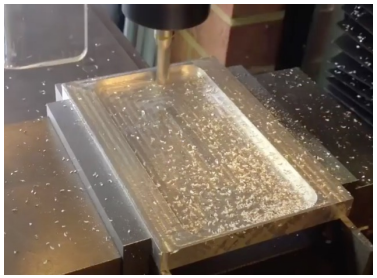
剪切力 (Shear)



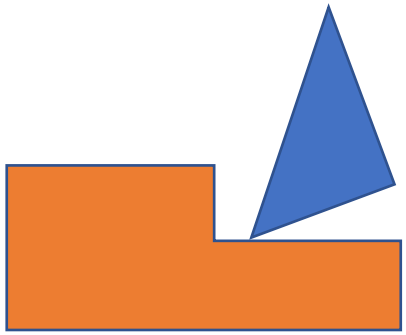






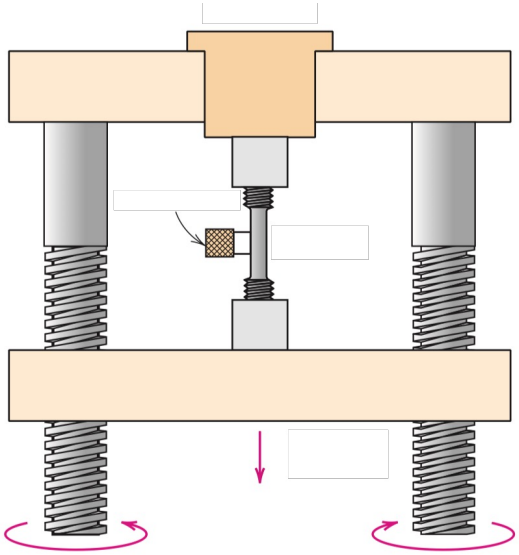


By DCTSolutionsAU
https://www.youtube.com/watch?v=DabKGF9Uiig



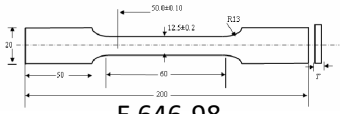
拉伸实验 (Tensile Tests)

https://www.youtube.com/watch?v=D8U4G5kcpcM



https://safirewaterjet.co.uk/

https://rtilab.com/analytical-services/materials-testing-division/tensile-testing/

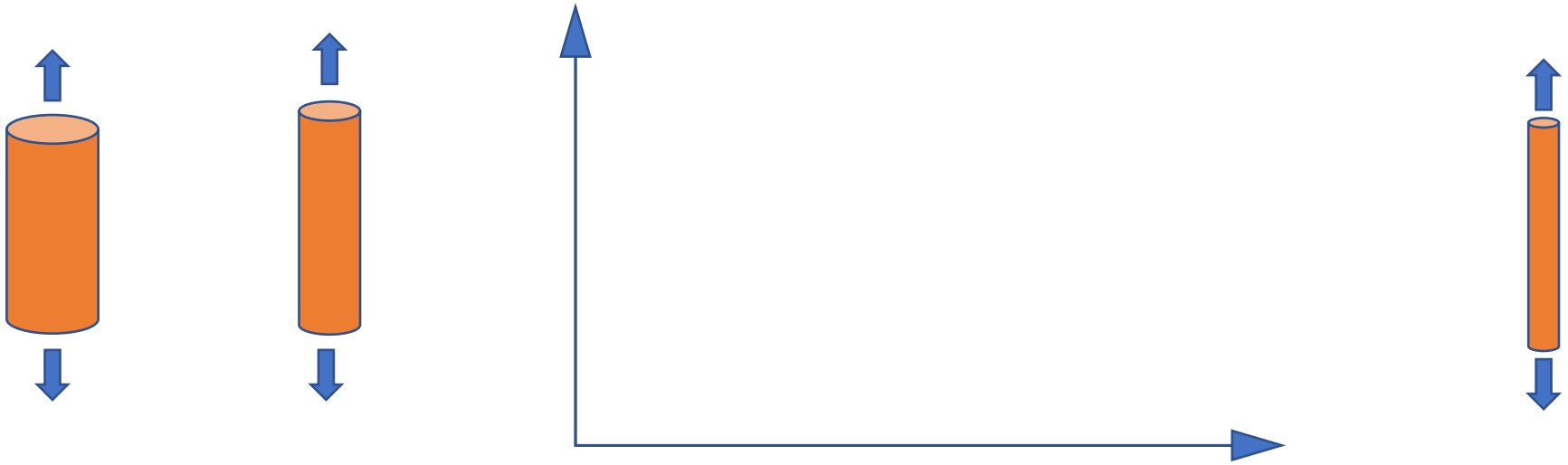


E 646-98

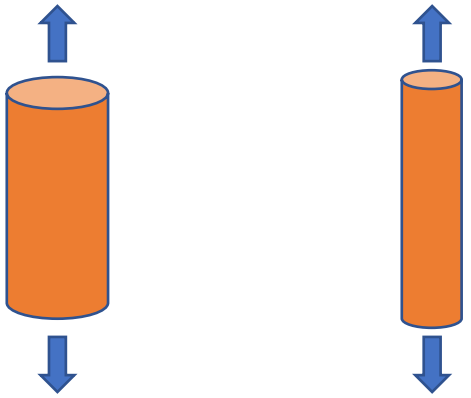
ASTM INTERNATIONAL

American Society for Testing and Materials

拉伸实验 (Tensile Tests)



从“力-距离”到“应力-应变”



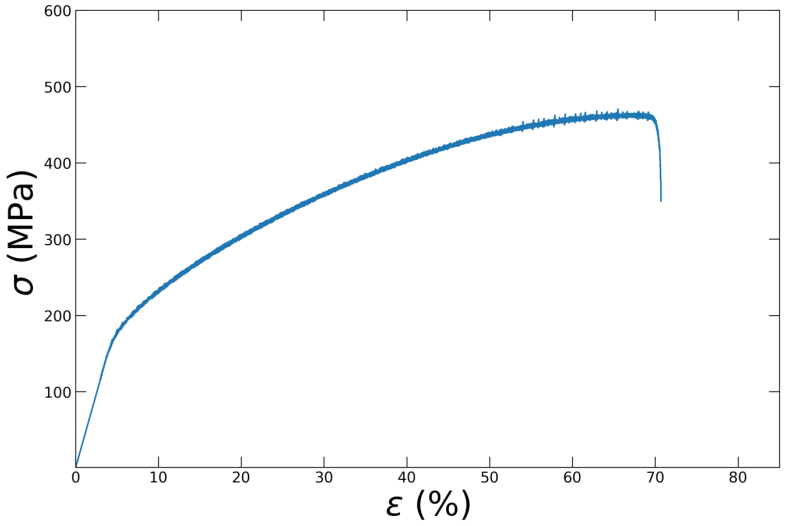
应力 (stress):

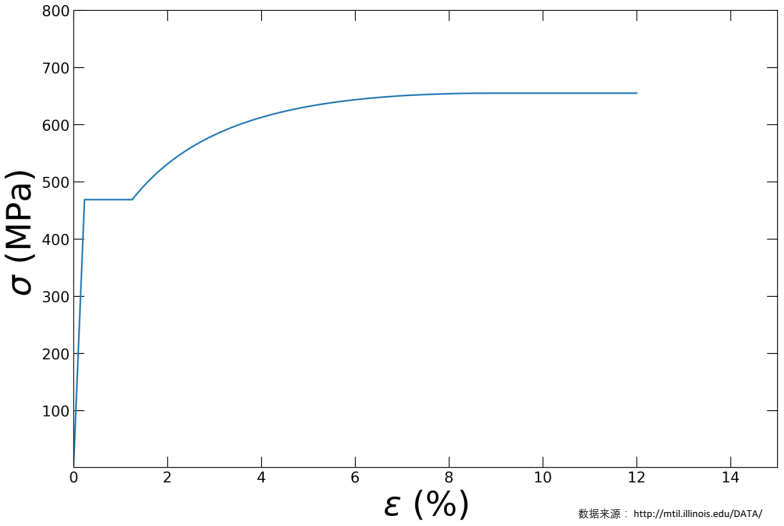
Stress-strain curves

应变 (strain):

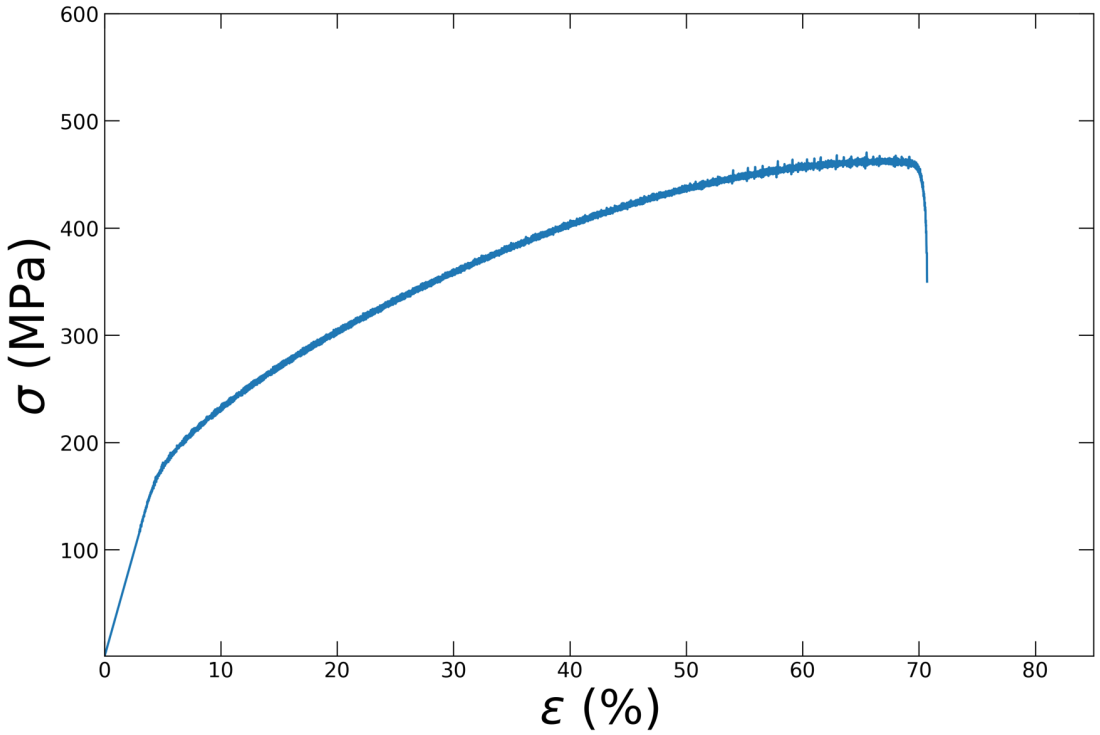
应力-应变 曲线 Stress-strain curves

- 一些典型的曲线





应力-应变，我们在乎啥？

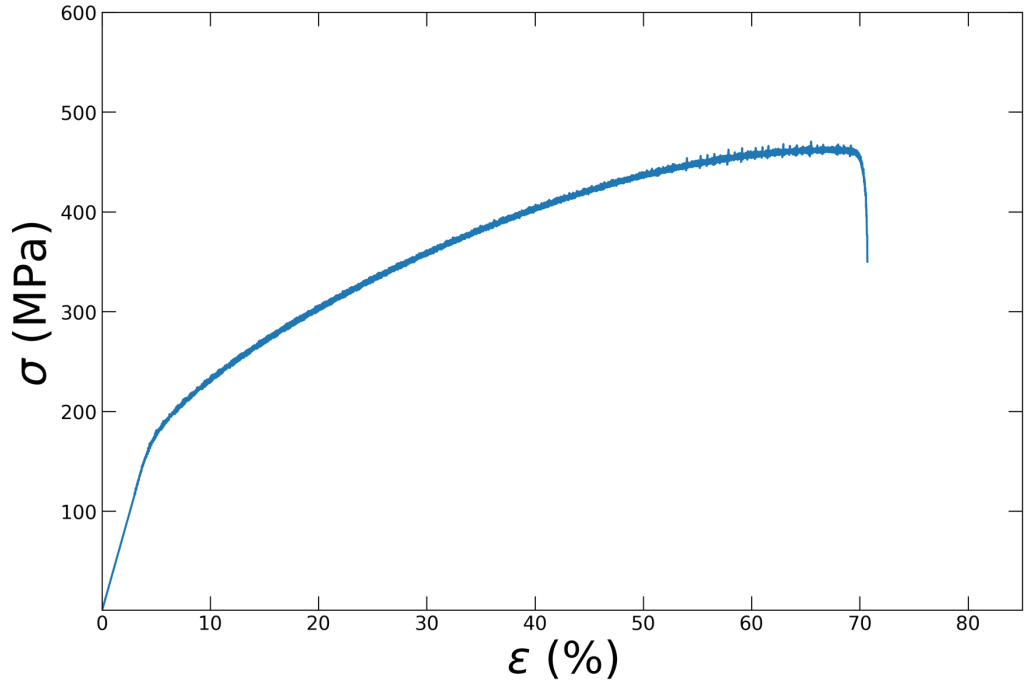


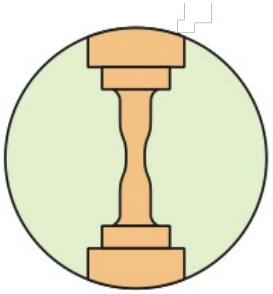
有哪些特征？

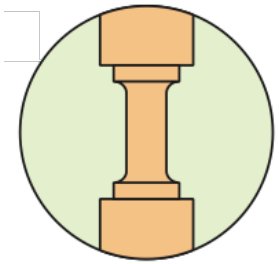
什么时候达到最大值？

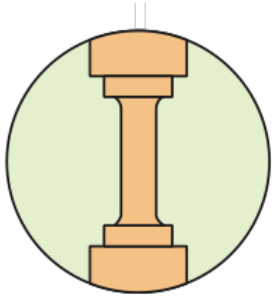
什么时候断裂？

应力-应变的几个阶段

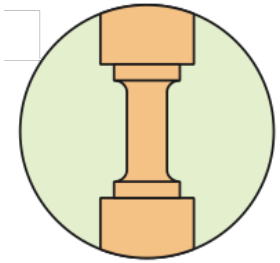


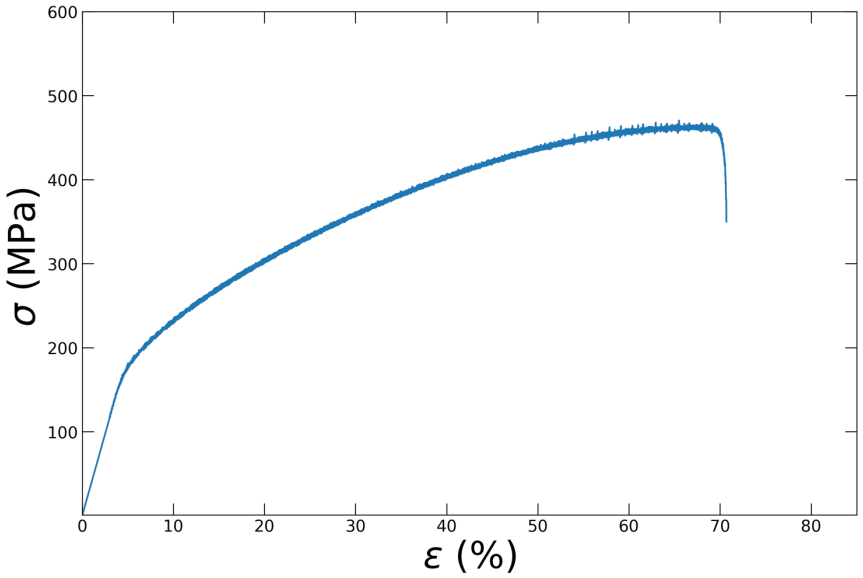




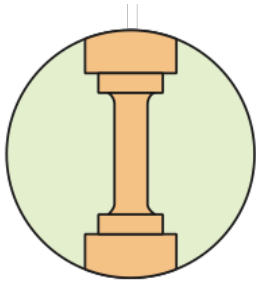


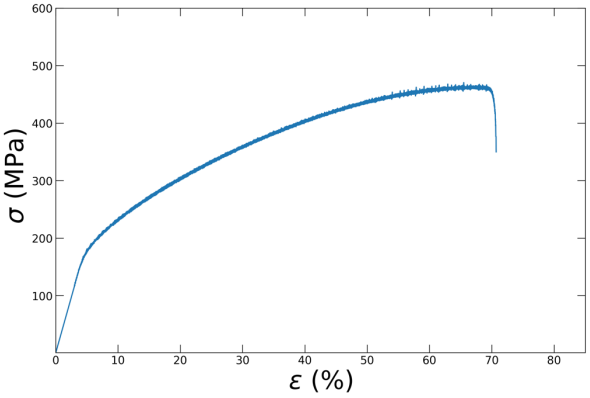
应力-应变 阶段一：弹性形变

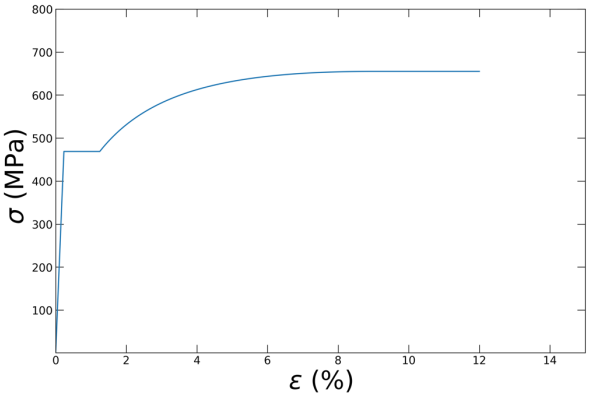


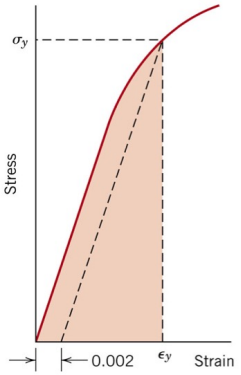


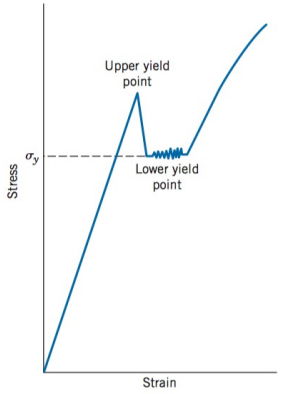
应力-应变 阶段二：屈服 (yielding)



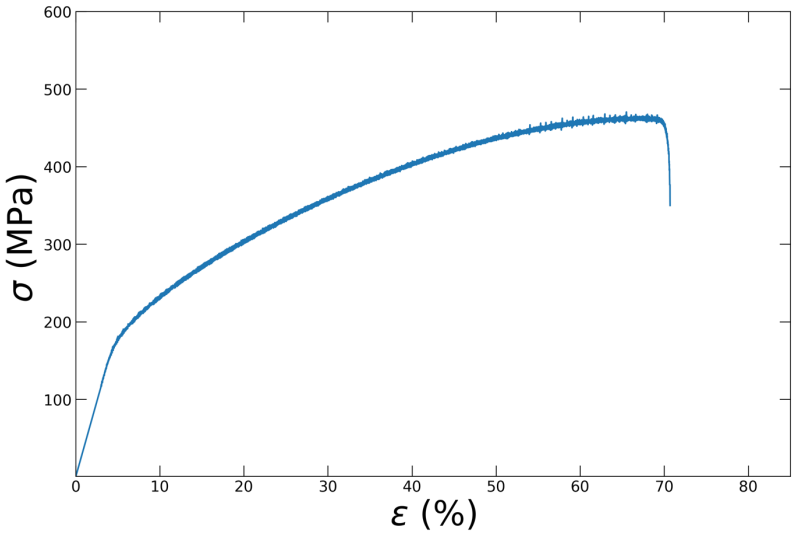


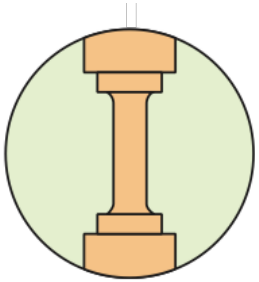




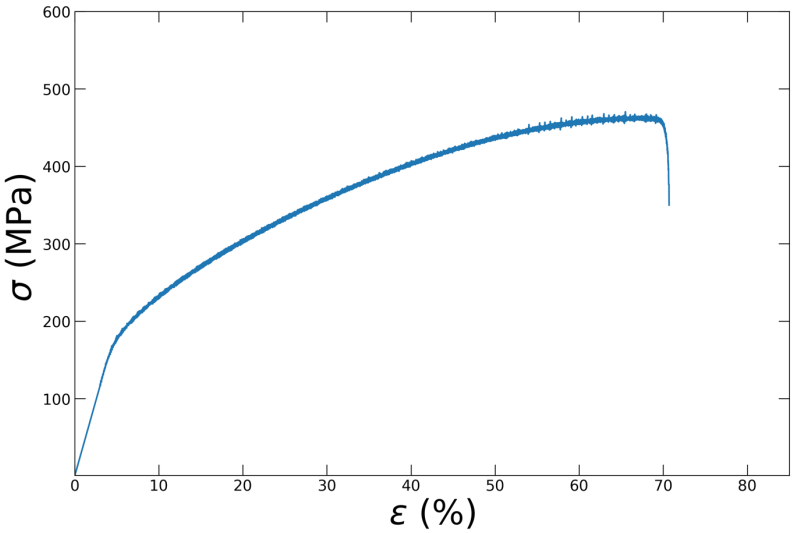


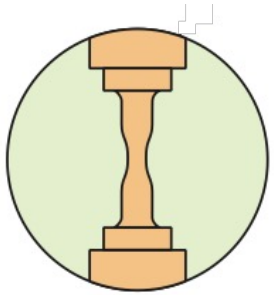
应力-应变 阶段三：塑性变形 (稳定)

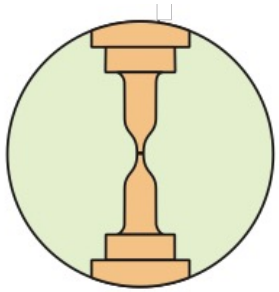


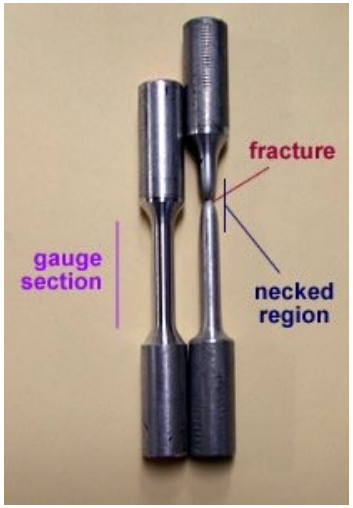


应力-应变 阶段四：颈缩-断裂 (不稳定)









5. 弹性形变的微观与胡克定律

dswen94