

Mühendislik Fakültesi



Kimya Mühendisliği Bölümü

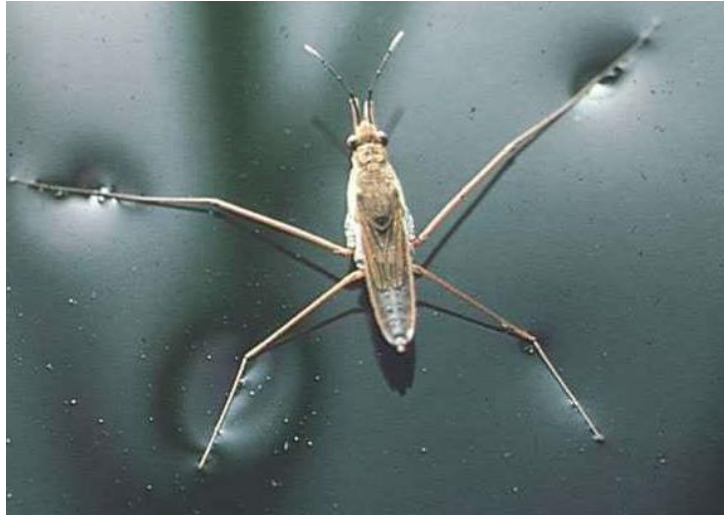
KMB201-Fizikokimya

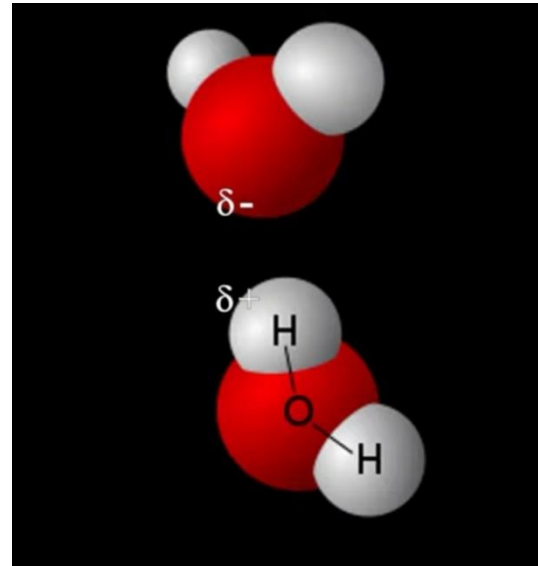
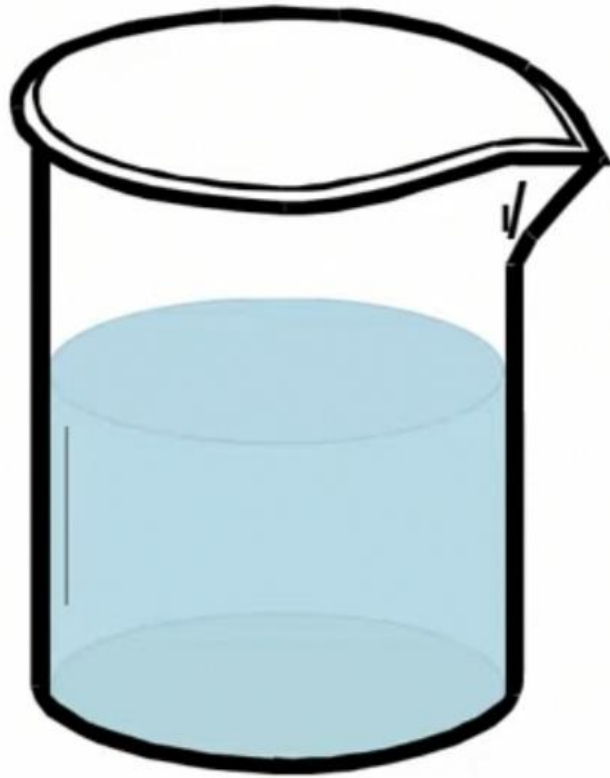
Dr. Öğr. Üyesi, İsa DEĞİRMENCI

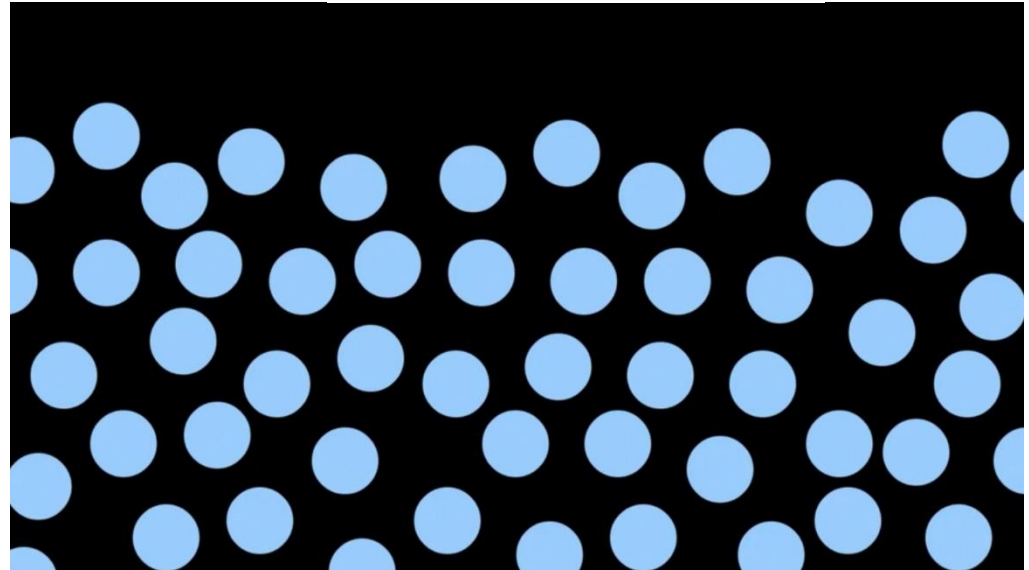
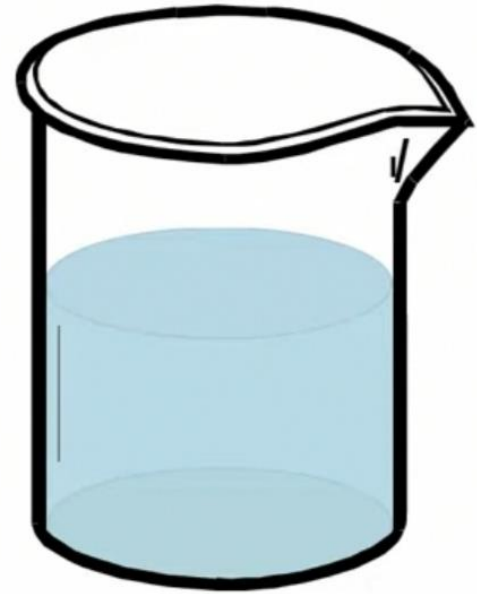
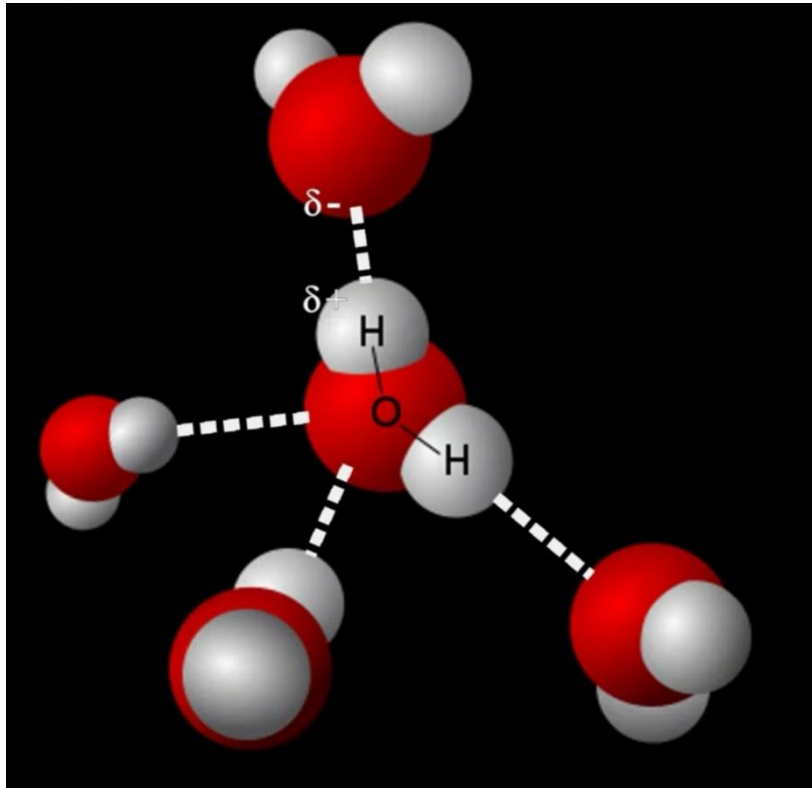
Yüzey Gerilimi

KMB201-Fizikokimya

Hafta-15

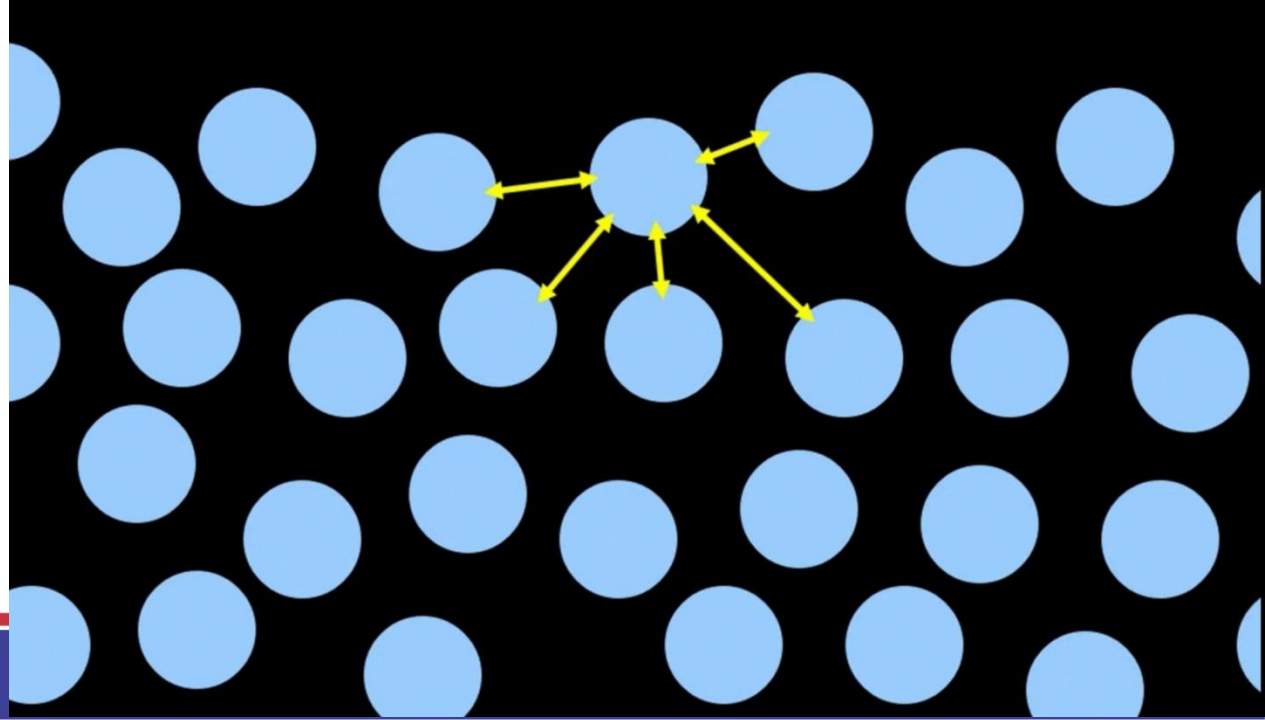


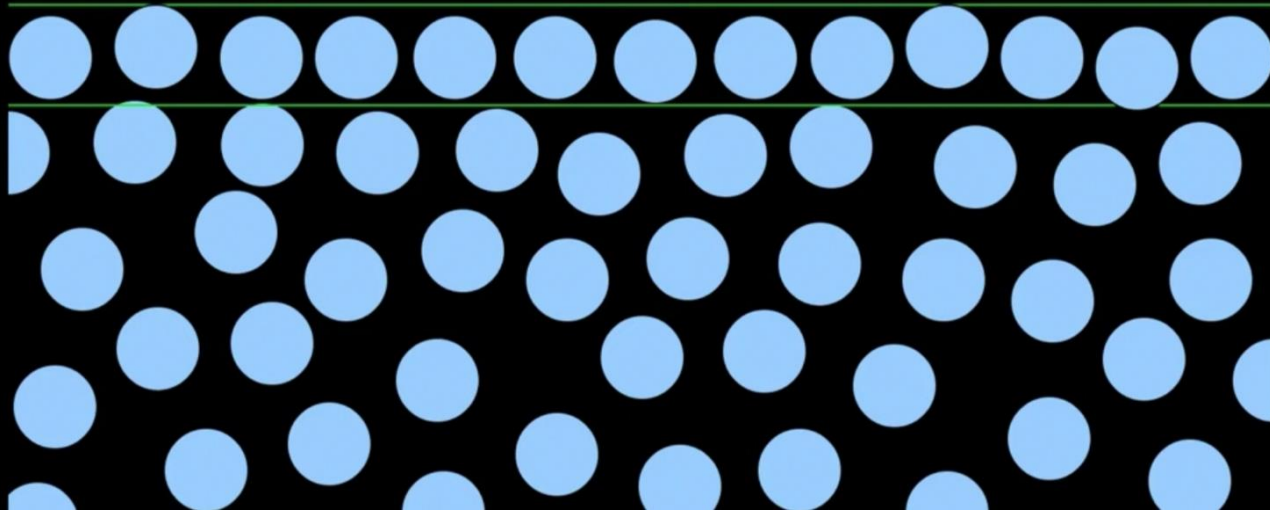


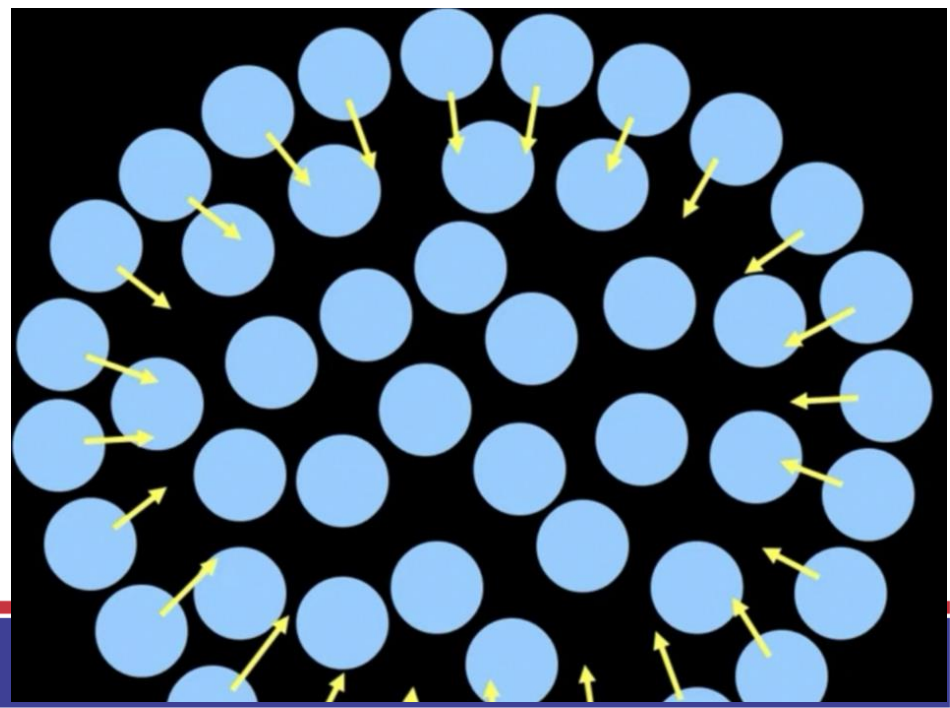
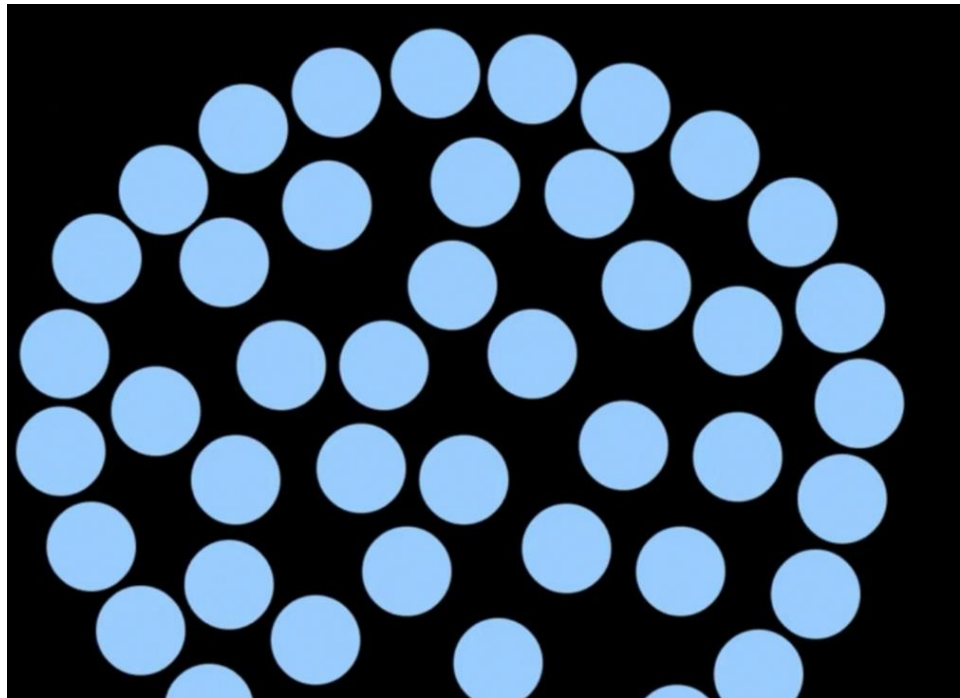


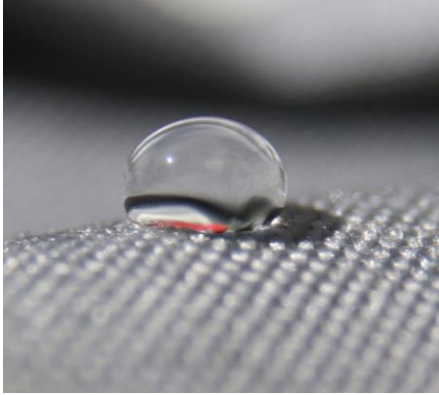
Yüzeyin altındaki
moleküller arası
etkileşimler

Yüzeydeki
moleküller arası
etkileşimler

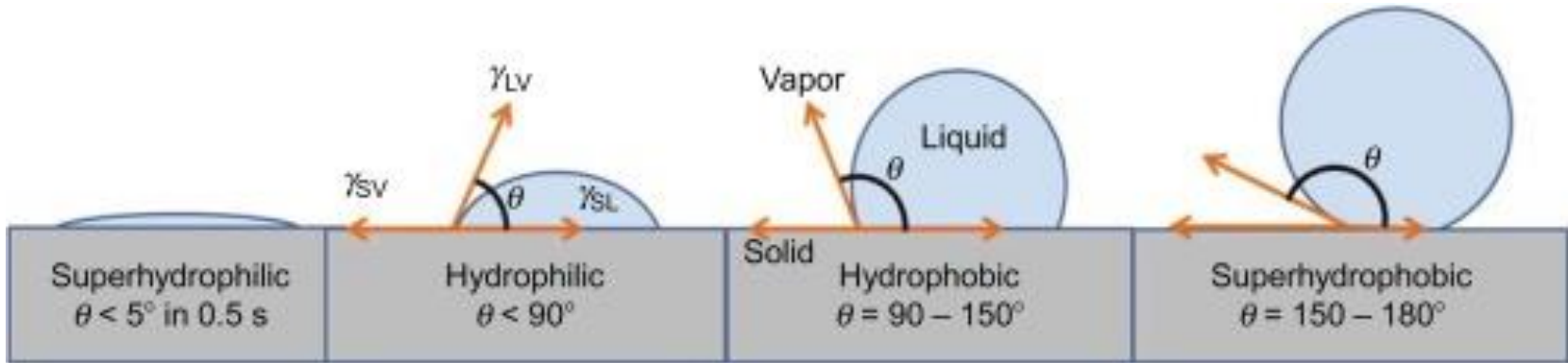


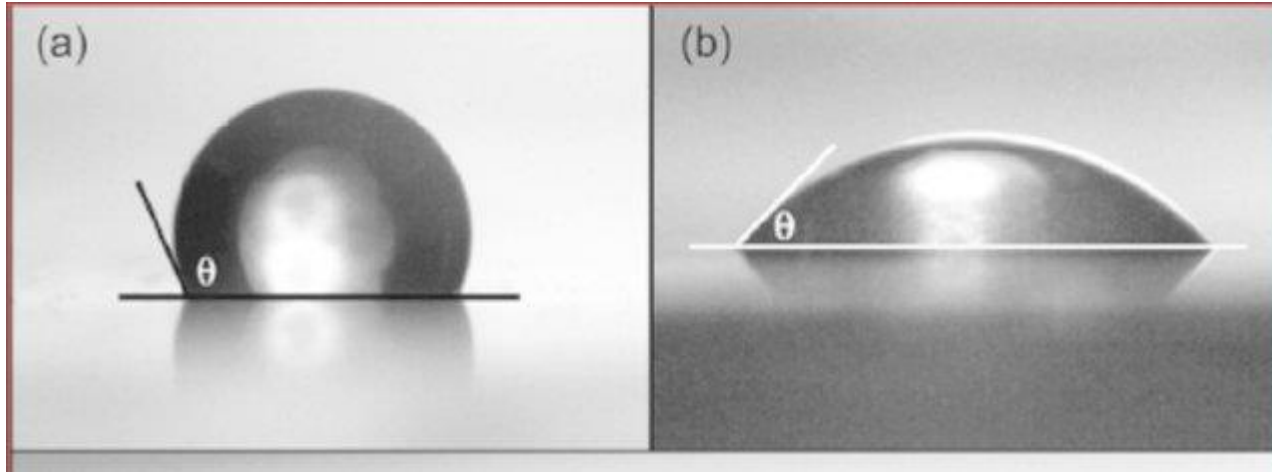






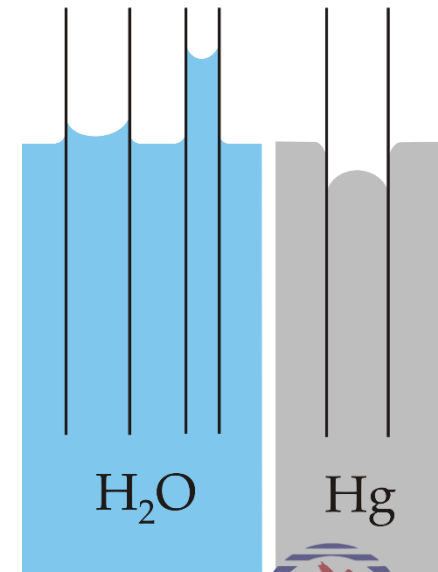
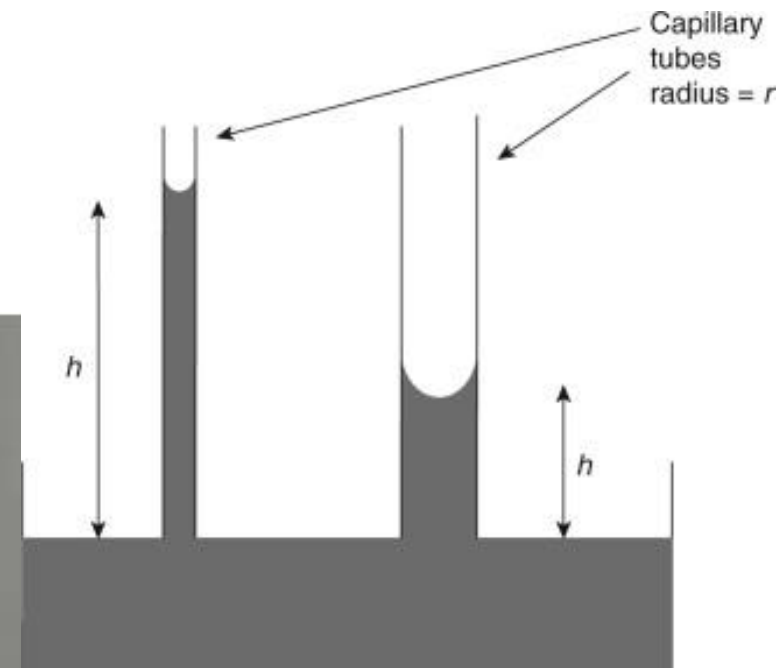
Kumaş üzerindeki su damlası



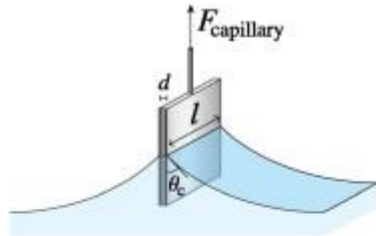


- a) Üzeri parafin ile kaplanmış cam yüzeyindeki su damlası
- b) Normal cam yüzeyindeki su damlası

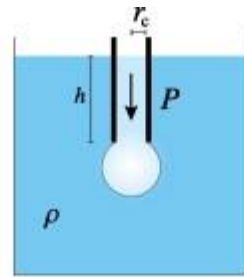
Kapileri boruda suyun yükselmesi



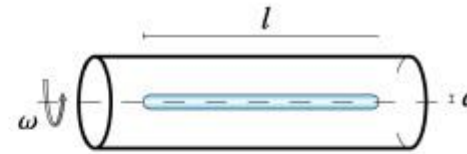
Yüzey Gerilim Ölçüm Yöntemleri



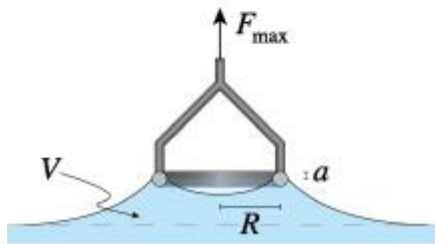
Wilhelmy plate



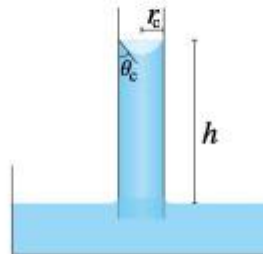
Maximum bubble pressure



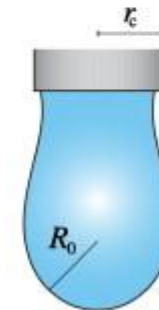
Spinning drop



Du Noüy Ring

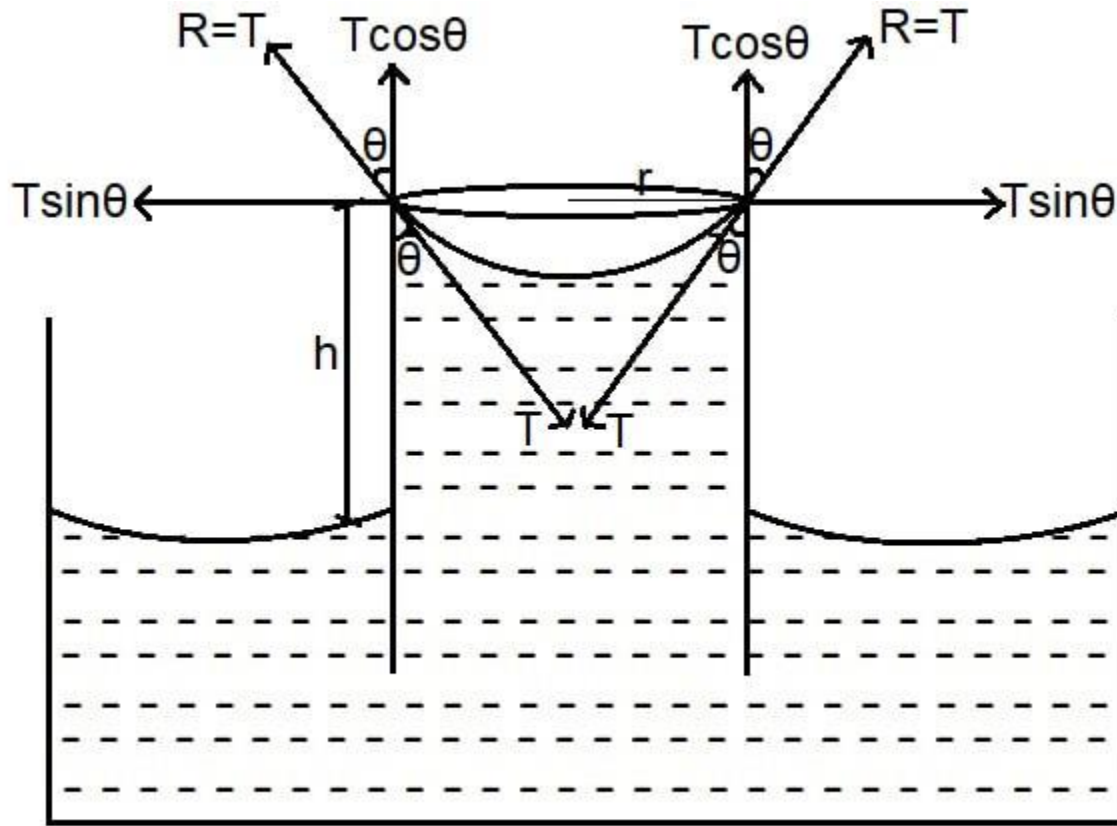


Capillary rise



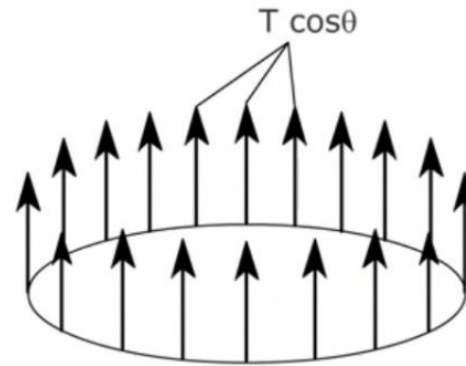
Pendant drop





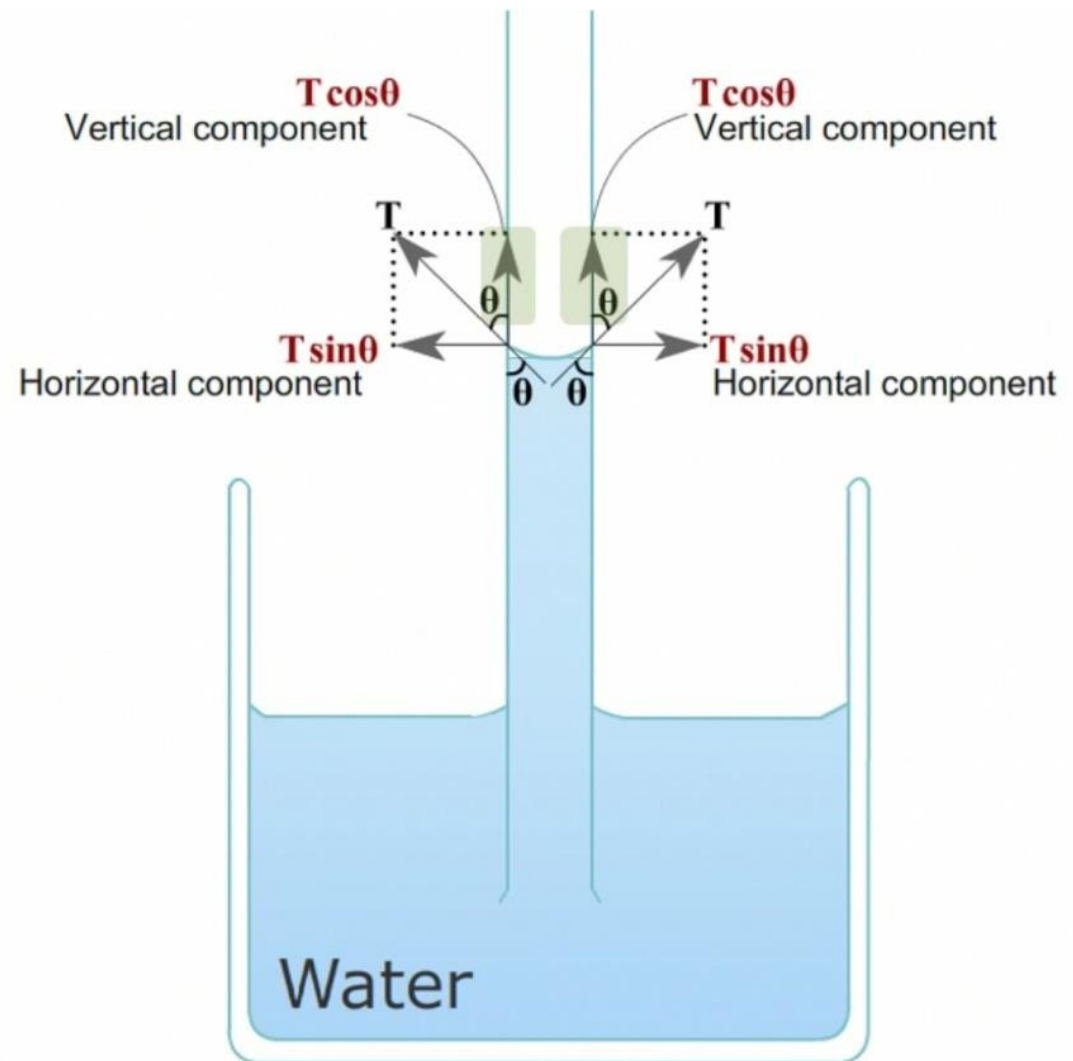
$$T = \sigma = \gamma = \text{Yüzey gerilimi}$$

$$L = 2\pi r$$
$$2\pi r T \cos\theta$$



$$T \times \cos\theta$$

$$F_v = T \cos \theta \times 2\pi r$$



Yüzey gerilimi kaynaklı
yukarı yönlü kuvvet

$$T \times \cos\theta$$

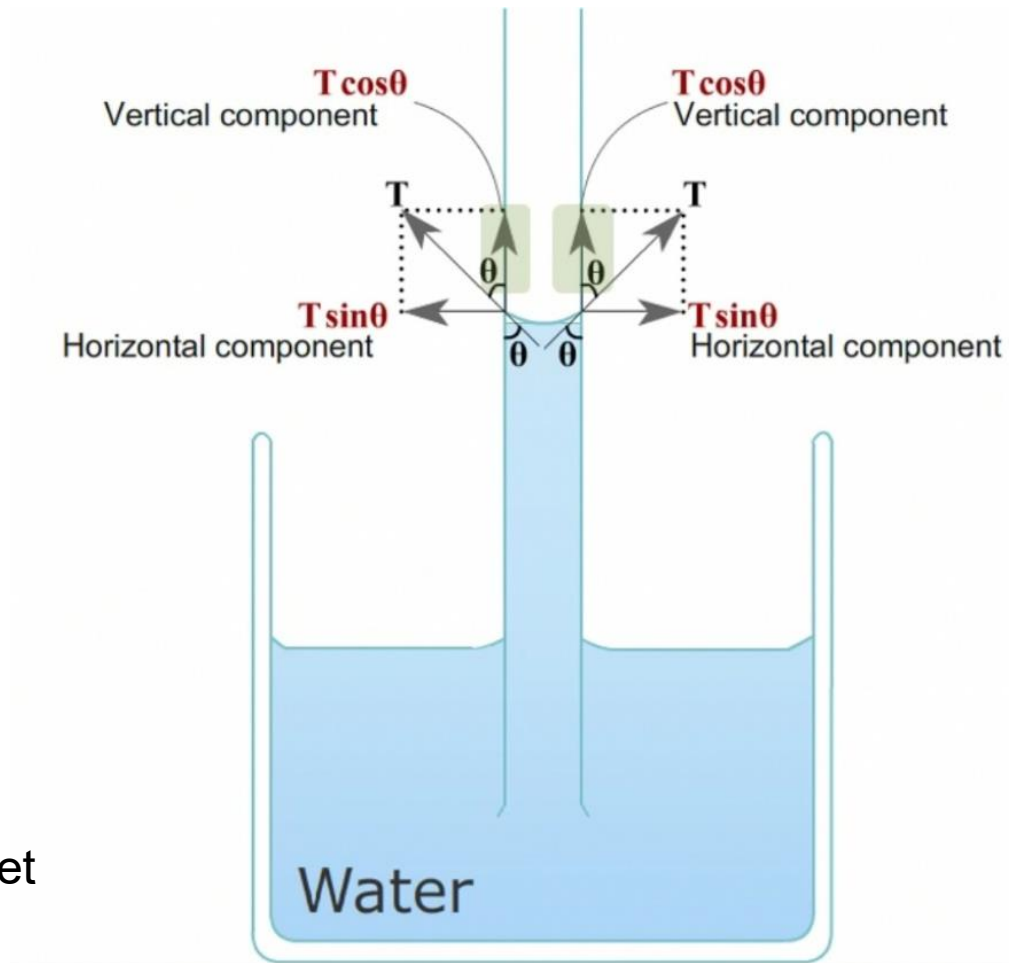
$$F_v = T \cos \theta \times 2\pi r$$

Kolondaki suya uygulanan
aşağı yönlü yerçekimi kuvveti

$$\pi r^2 h \rho g$$

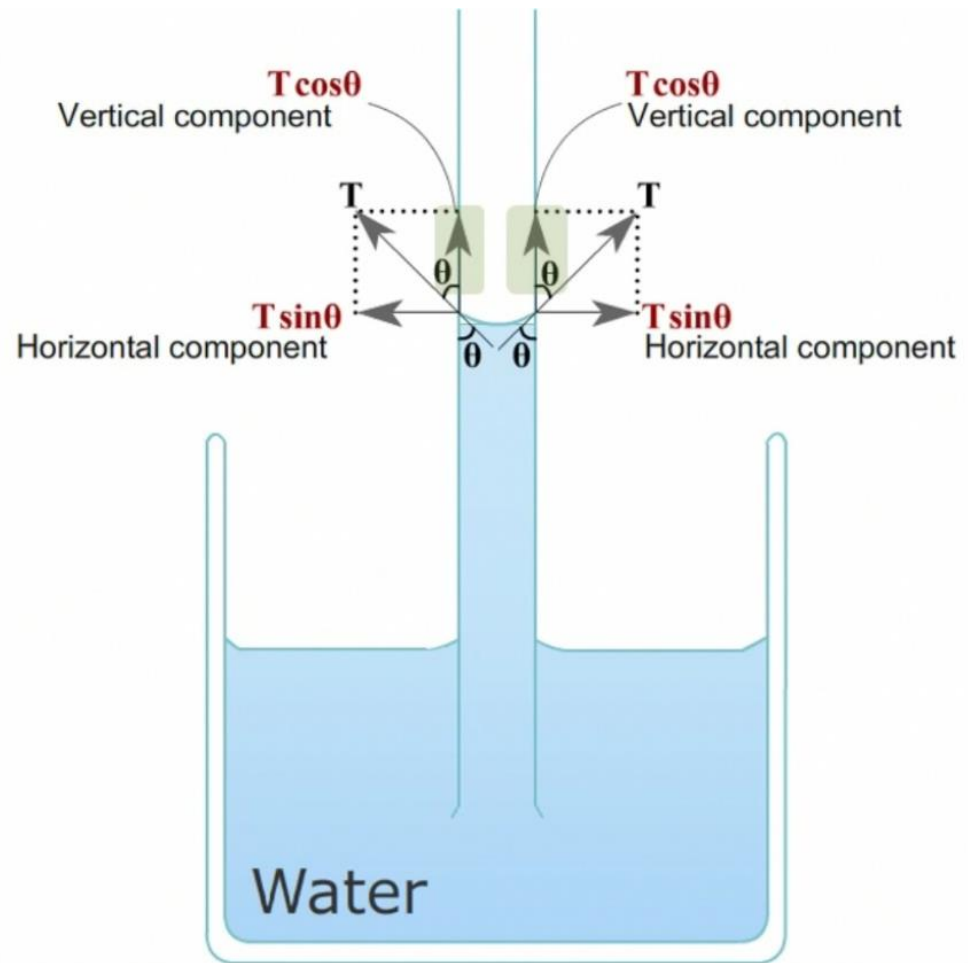
Yukarı yönlü kuvvet=aşağı yönlü kuvvet

$$2\pi r T \cos\theta = \pi r^2 h \rho g$$

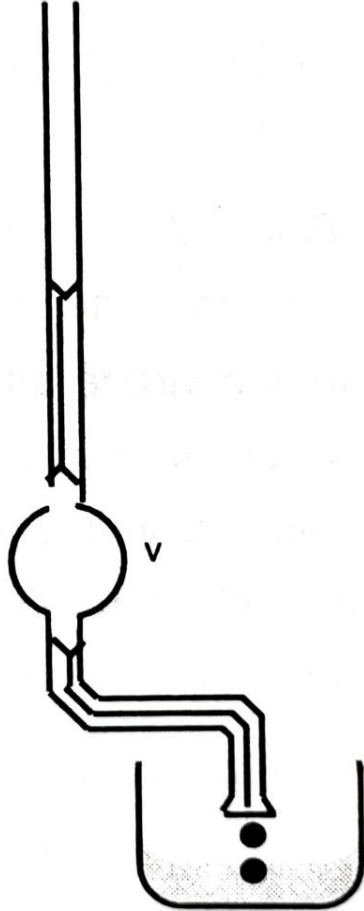


$$2\pi r T \cos\theta = \pi r^2 h \rho g$$

$$T = \frac{\pi r^2 h \rho g}{2\pi r \cos\theta}$$



Stalagmometre ile Yüzey Gerilimi Ölçümü

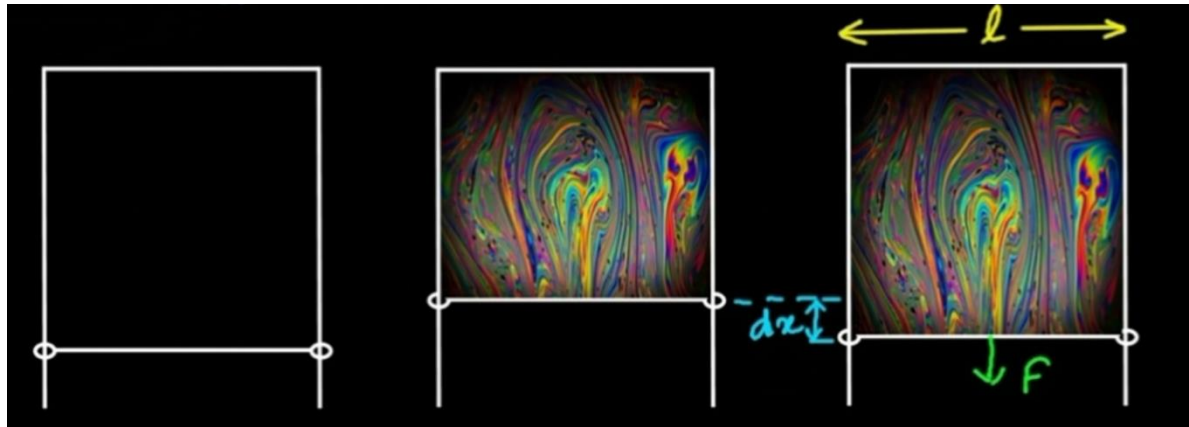
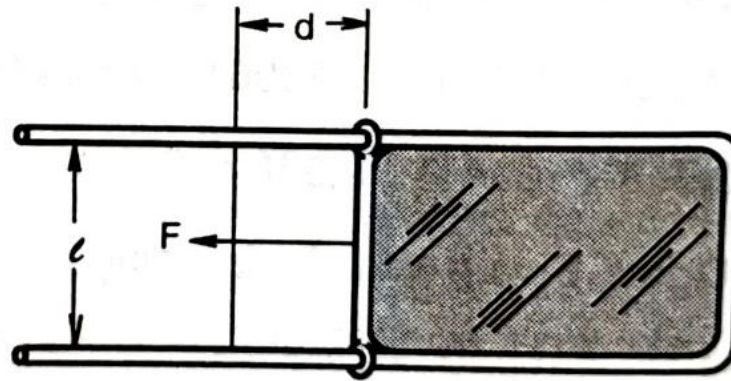


$$mg = 2\pi r\sigma$$

$$mg = (V/f)\rho g$$

$$\sigma = (V\rho g)/(2\pi r f)$$





$$\text{Yapılan iş} = F \cdot dx$$

$$\text{Alan genişlemesi için gerekli olan enerji} = 2Ldx \sigma$$

$$\text{Alan genişlemesi} = 2Ldx$$

(iki yüzey olduğu için)

$$F \cdot dx = 2Ldx \sigma$$

$$\sigma = F/2L$$

