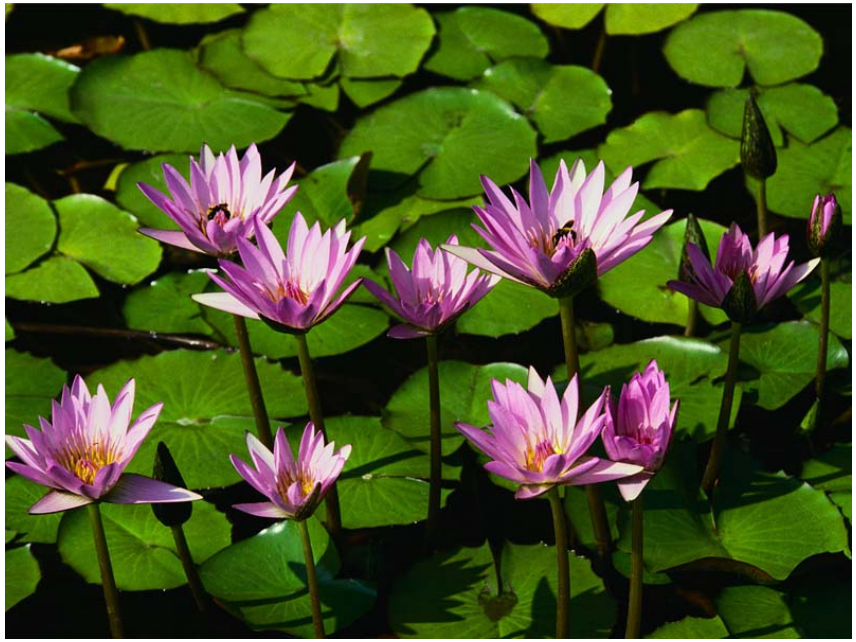
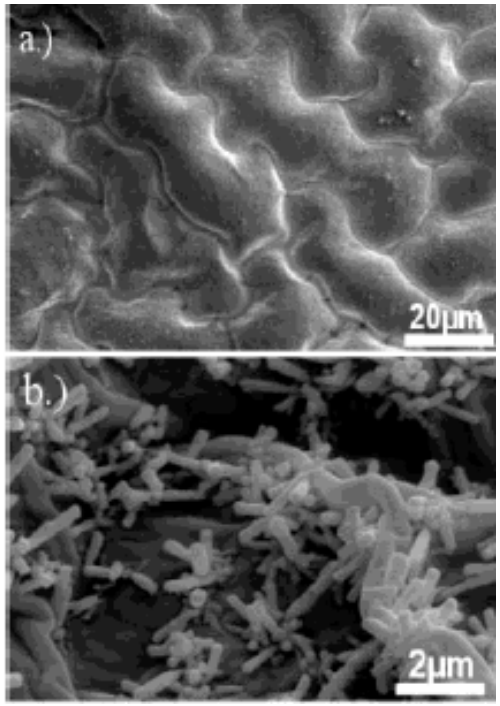
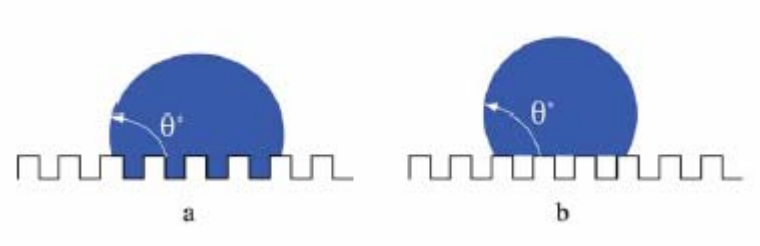
Lotus effect





Langmuir **2004**, *20*, 2405−2408

Surperhydrophobic



Wenzel state

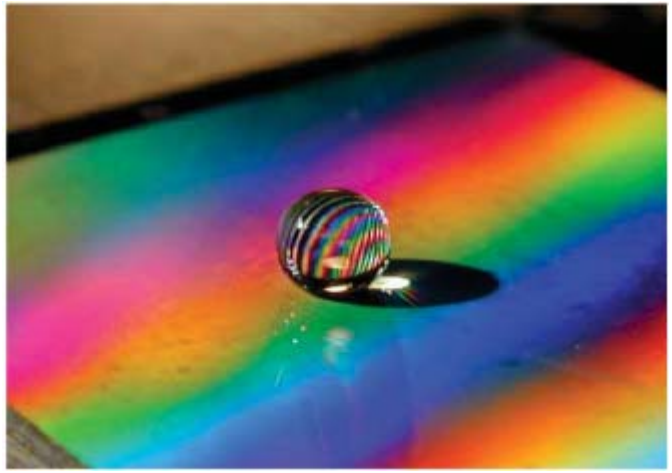
$\cos\theta^* = r\cos\theta$

Cassie state

$\cos\theta^* = -1 + \phi_s(\cos\theta + 1)$

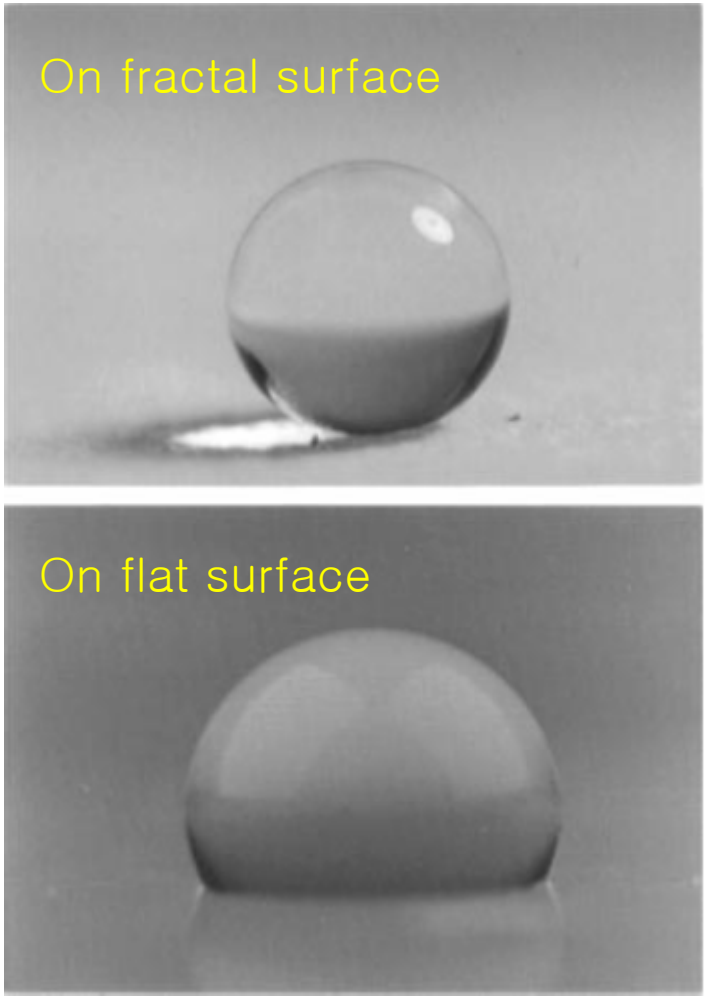
초소수성 조건

1. 접촉면이 작아야 한다.
2. Aspect ratio 가 크면 유리.
3. 표면에너지가 낮아야 한다.
4. 마이크로/나노 복합구조.



Super-Water-Repellent Fractal Surfaces

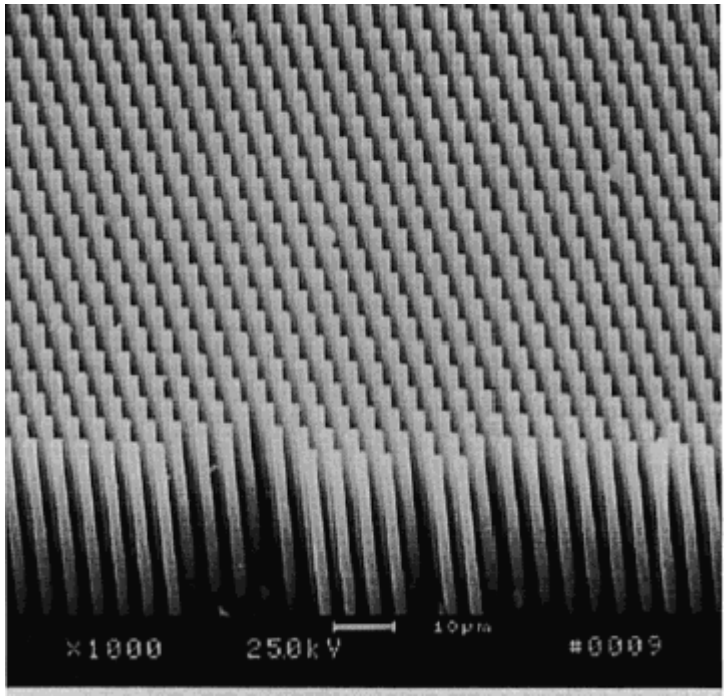
T. Onda,*,† S. Shibuichi,† N. Satoh,‡ and K. Tsujii†



Langmuir **2000**, *16*, 7777−7782

Ultrahydrophobic Surfaces. Effects of Topography Length Scales on Wettability

Didem Öner and Thomas J. McCarthy*

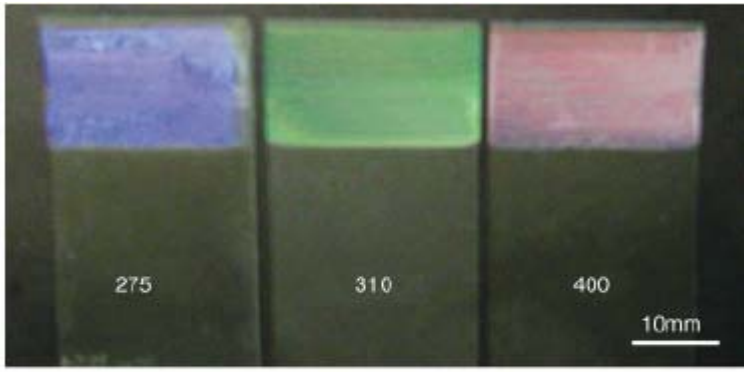


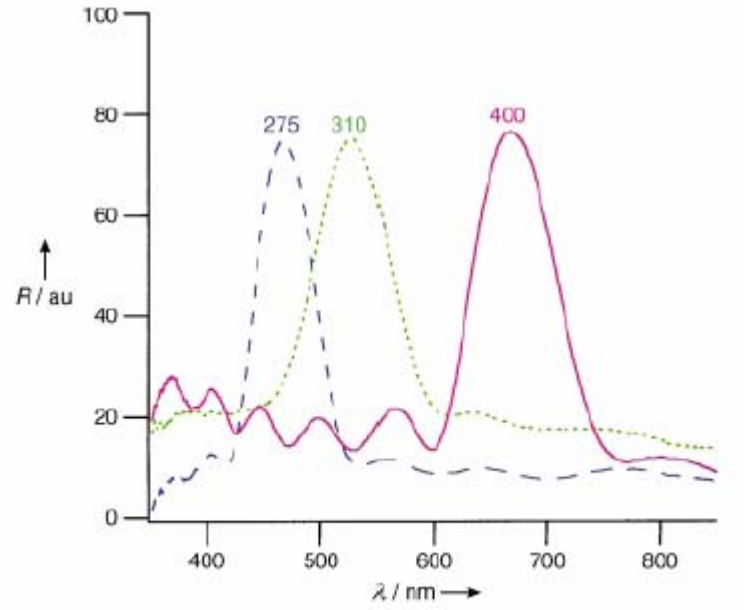
silicon surface	DMDCS-modified		ODMCS-modified		FDDCS-modified	
	θ_A (deg)	θ_R (deg)	θ_A (deg)	θ_R (deg)	θ_A (deg)	θ_R (deg)
smooth	107	102	102	94	119	110
2μmSP40μm	176	141	174	141	170	146
8μmSP40μm	173	134	173	139	170	140
16μmSP40μm	171	144	174	134	168	145
32μmSP40μm	168	142	170	132	170	146
64μmSP40μm	139	81	114	65	149	100
128μmSP40μm	116	80	95	58	131	93

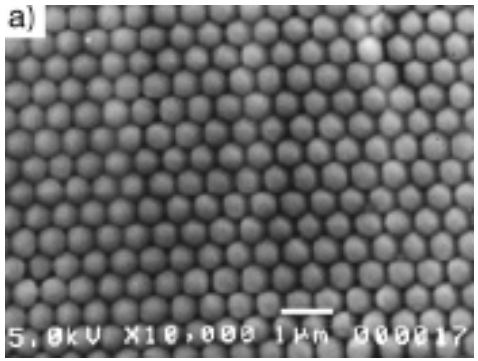
Surface Effects from Nanostructure

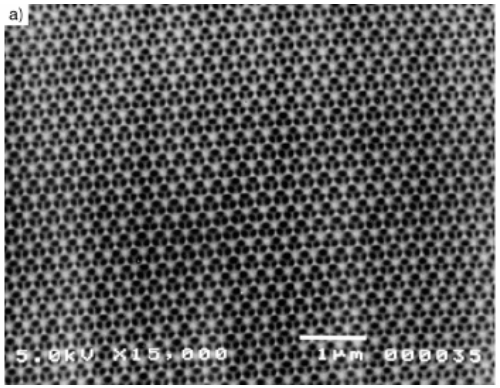
Structural Color and the Lotus Effect**

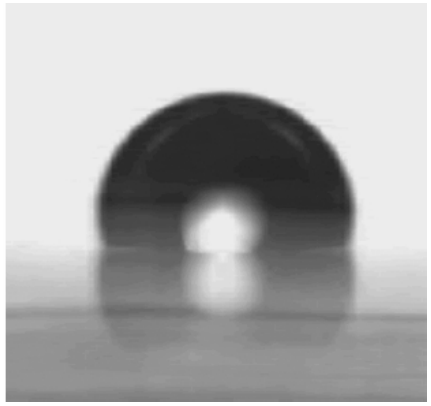
*Zhong-Ze Gu, Hiroshi Uetsuka, Kazuyuki Takahashi, Rie Nakajima, Hiroshi Onishi, Akira Fujishima, and Osamu Sato**

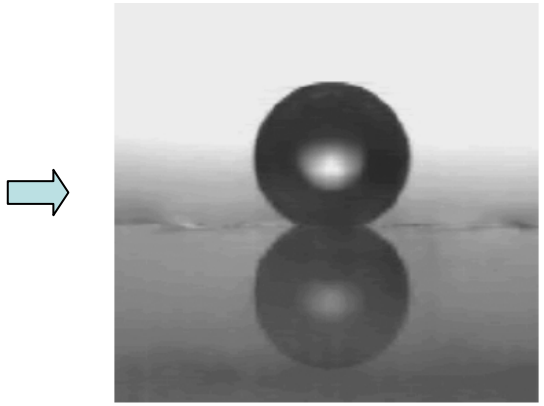






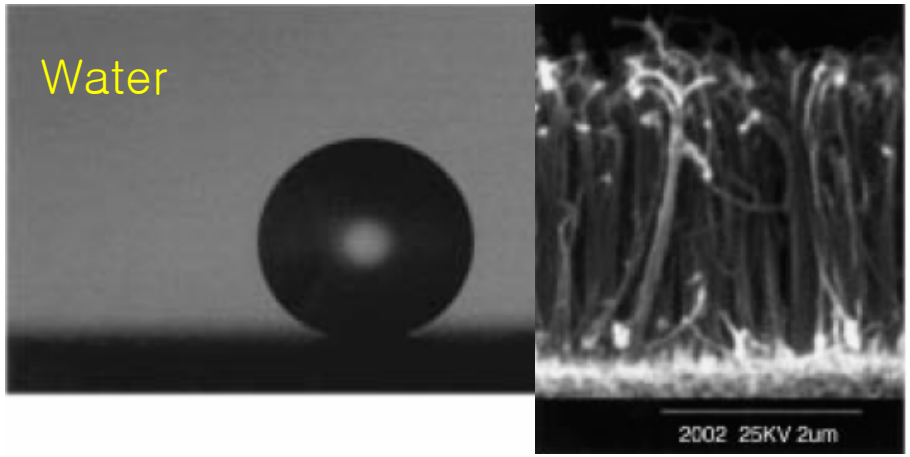






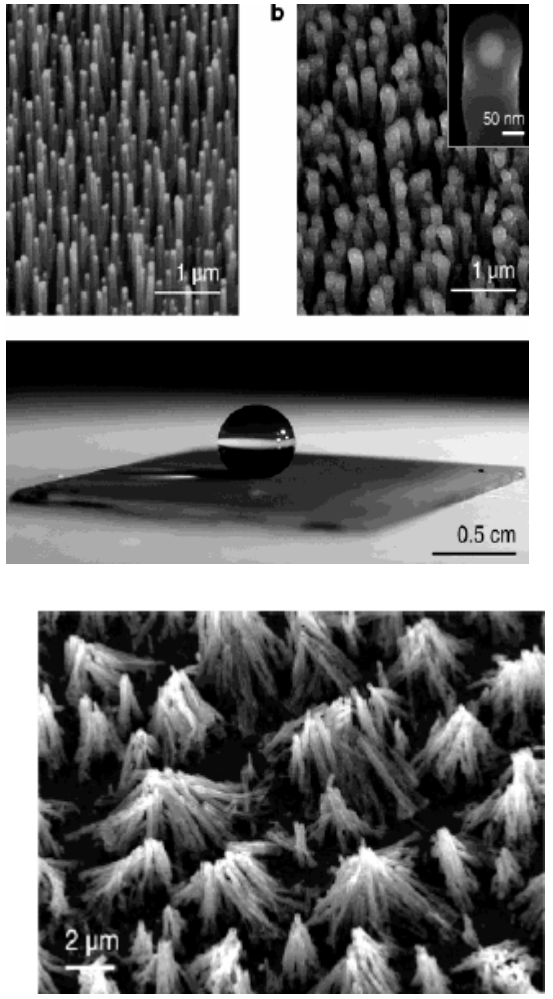
Super-"Amphiphobic" Aligned Carbon Nanotube Films**

Huanjun Li, Xianbao Wang, Yanlin Song, Yunqi Liu, Qianshu Li, Lei Jiang,* and Daoben Zhu



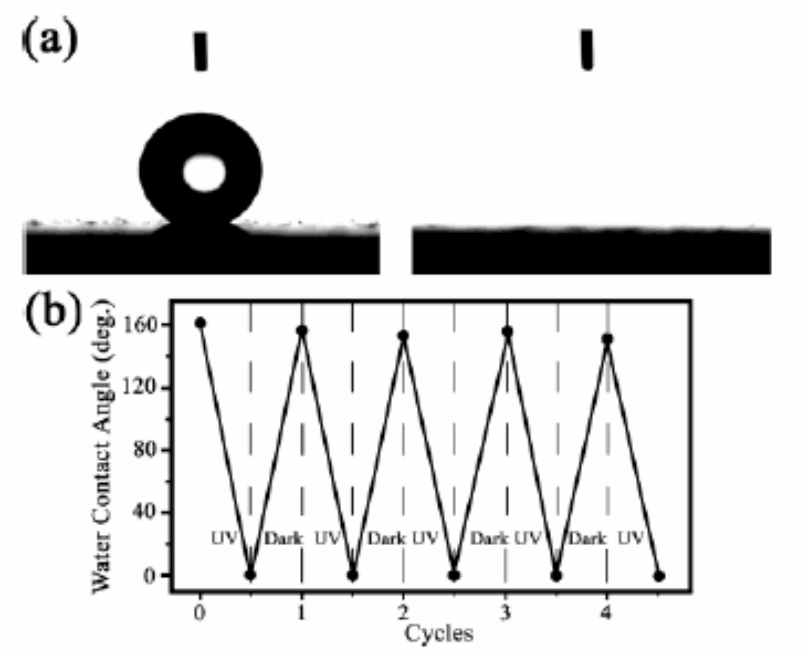
Superhydrophobic Carbon Nanotube Forests

Kenneth K. S. Lau,*,† José Bico,‡ Kenneth B. K. Teo,§ Manish Chhowalla,|| Gehan A. J. Amaratunga,§ William I. Milne,§ Gareth H. McKinley,‡ and Karen K. Gleason†



Reversible Super-hydrophobicity to Super-hydrophilicity Transition of Aligned ZnO Nanorod Films

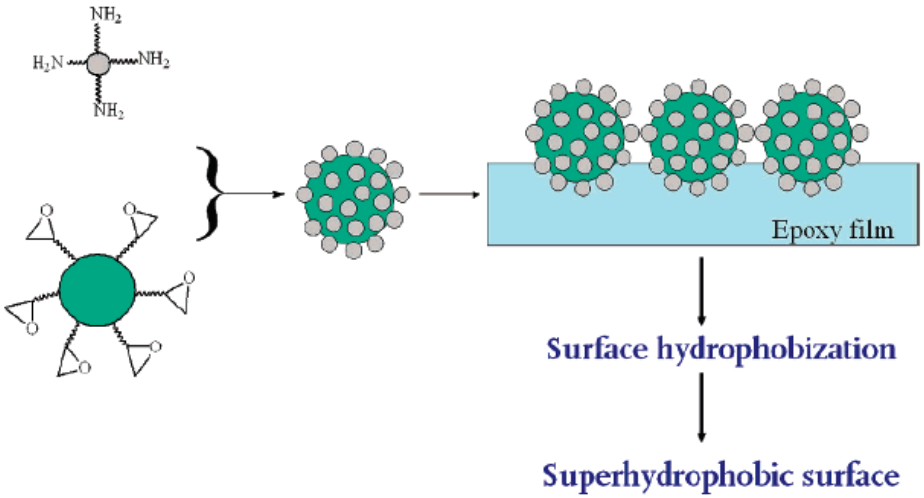
Xinjian Feng, Lin Feng, Meihua Jin, Jin Zhai, Lei Jiang,* and Daoben Zhu



Superhydrophobic Films from Raspberry-like Particles

W. Ming,* D. Wu, R. van Benthem, and G. de With

Nano Lett. 2005



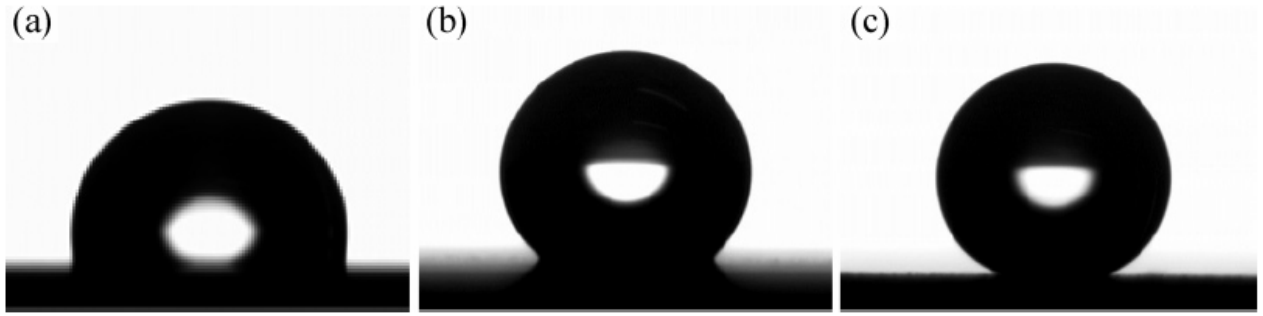


Figure 2. Water droplets of 5 μL on PDMS-covered epoxy-based films containing (a) no particles, (b) large silica particles, and (c) raspberry-like particles.

Applications

- 도료 및 페인트 (아파트 외벽 및 자동차):
- Self-cleaning paint (Lotusan: www.stocorp.com)

Super-hydrophobic	• Extremely water repellent • Outstanding resistance to soiling • Improved resistance to mold, mildew, and algae

Water and dirt flow off immediately. The facade remains dry and attractive.