Electronic Supplementary Material (ESI) for Soft Matter.

SUPPLEMENTARY INFORMATION

Nanotribological and Wetting Performance of the Hierarchical Patterns

H. S. Grewal[1#], Shuxue Piao[1,2#], Il-Joo Cho[1], Kyung-Young Jhang[3], Eui-Sung Yoon[1*]

[1]*Center for BioMicrosystems, Korea Institute of Science and Technology, Seoul, Republic of Korea*

[2]*Department of Automotive Engineering, Han Yang University, Republic of Korea*

[3] *School of Mechanical Engineering, Han Yang University, Republic of Korea*

[*]Corresponding author Email: esyoon@kist.re.kr (Eui-Sung Yoon)

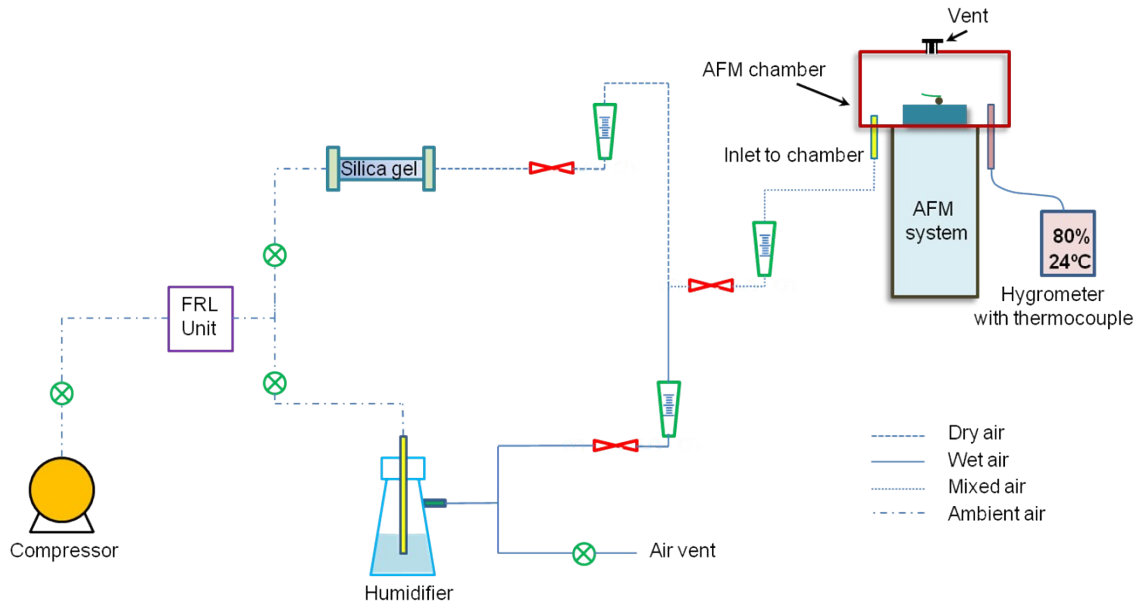

Fig. S1 The diagram showing the set-up used for controlling the relative humidity in the AFM chamber

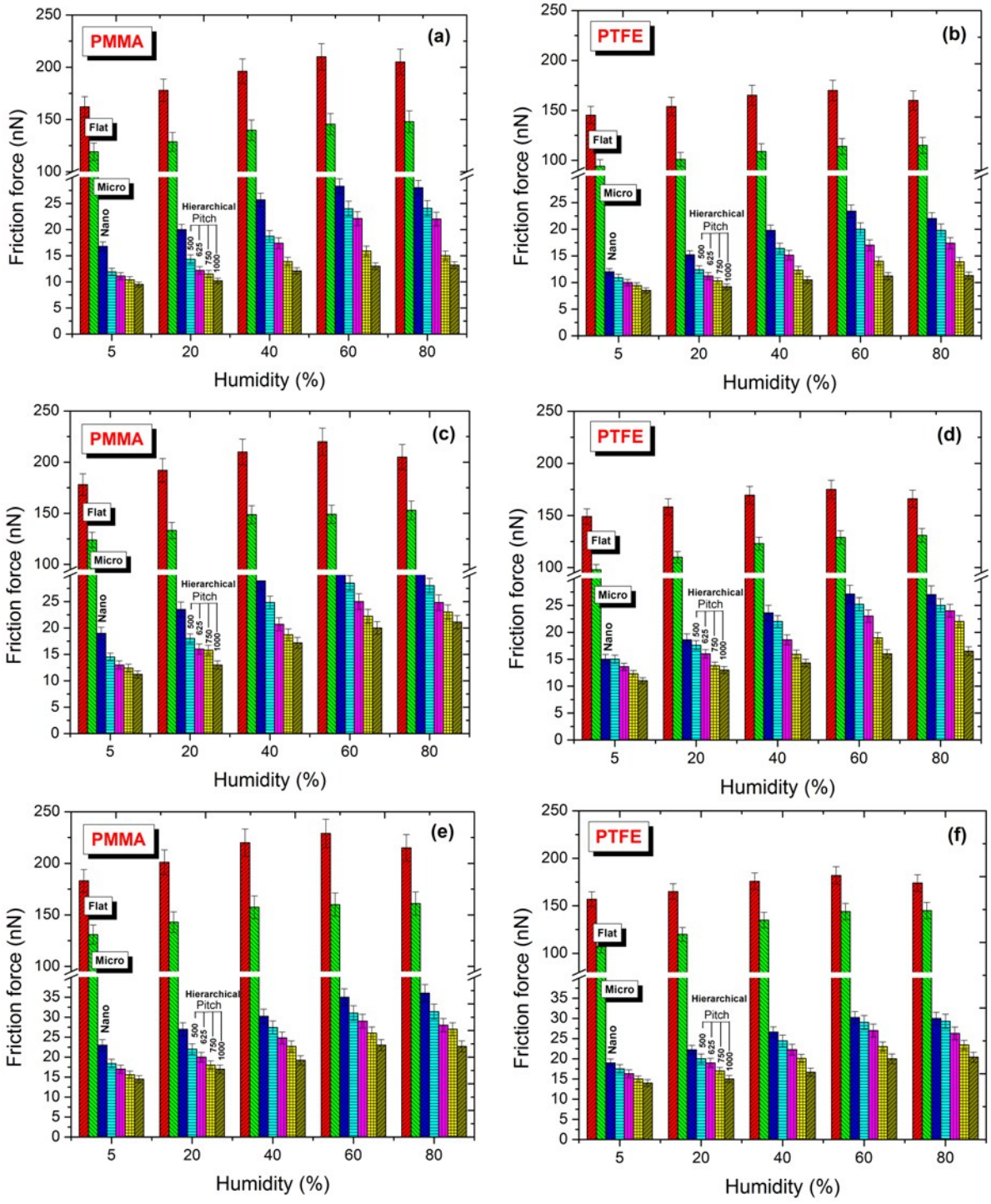

Fig. S2 Friction force of the flat and patterned polymethylmethacrylate (PMMA) and polytetrafluoroethylene (PTFE) coated surfaces under different relative humidity and normal loads, (a) and (b) at normal load of 40 nN, (c) and (d) at normal load of 80 nN, (e) and (f) at normal load of 120 nN.

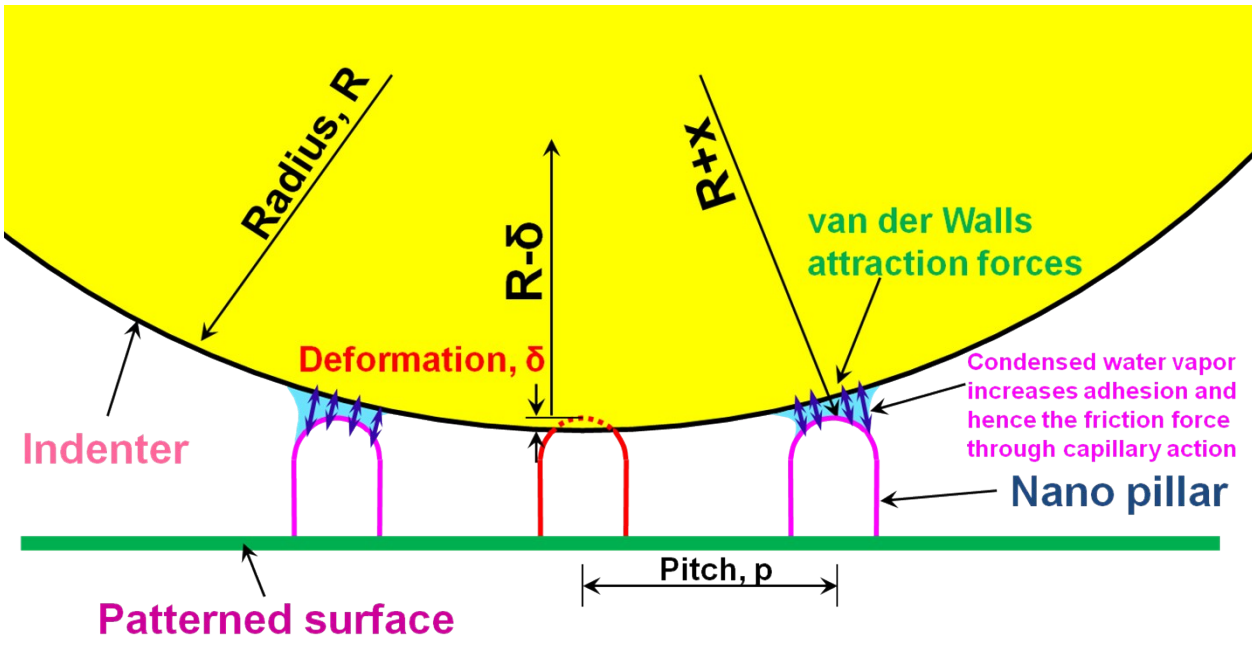

Fig. S3. Contact between the nano pillars of the patterned surface and the ball tip. The retarded van der Waals force and capillary force transformed the single-asperity condition to a multi-asperity condition.

Table S1 The Hamaker constant and values of parameters used in Eq (3)

Material	Dielectric constant, ε	Refractive index, n	Absorption frequency, ν_e	Hamaker constant, $A_{glass/water/surface}$
Water	80	1.334	3×10^{15}	-
Borosilicate glass	4.6	1.478	3×10^{15}	-
polymethylmethacrylate (PMMA)	4	1.489	3×10^{15}	5.95×10^{-21}
polytetrafluoroethylene (PTFE)	2.1	1.359	3×10^{15}	1.02×10^{-21}

Table S2 Values of different parameters used for contact mechanics calculations

Material	Elastic modulus, E (GPa)	Poisson's ratio, ν	Surface energy, γ (J/m^2)
Borosilicate glass	64	0.2	0.25
polymethylmethacrylate (PMMA)	3.1	0.4	0.041
polytetrafluoroethylene (PTFE)	0.5	0.46	0.018