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Correction to On the Nanoengineering of Superhydrophobic and Impalement Resistant Surface Textures below the Freezing Temperature

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The expression for P_{max} (eq 11, page 179 in the paper) needs to be corrected, using the appropriate nondimensionalization, as

$$P_{max} = P_0 \frac{1.4}{\varepsilon \sqrt{h_{min}}} \qquad (1)$$

where P_0 is the ambient gas pressure and the nondimensional parameters, ε and h_{min}, need to be calculated as follows

$$\varepsilon = \frac{P_0}{(R\mu^{-1}V^7\rho_l^4)^{1/3}} \qquad (2)$$

$$h_{min} = 2.54 \frac{St^{8/9}}{Ca^{2/3}} \qquad (3)$$

Therefore, the final correct expression for dimensional P_{max} in eq 14, page 179 becomes

$$P_{max} = 0.88 \frac{(R\mu^{-1}V^7\rho_l^4 Ca)^{1/3}}{St^{4/9}} \qquad (4)$$

The above modifications require a change in Figure 8a, which is replotted below. The linear relationship between P_{max} and P_c still holds, that is, $P_{max} = kP_c$. However, the slope k comes out as ∼80 (and not 1.16); this numerical change must also be accounted for if one attempts to calculate the critical velocity of impalement from P_c. Our general statement in the manuscript that "the balance of P_{max} and P_c as performed here should be taken as an overall scaling analysis" remains valid. Note also that the change in the slope does not affect the validity of experimental results or any of the main conclusions of our study.
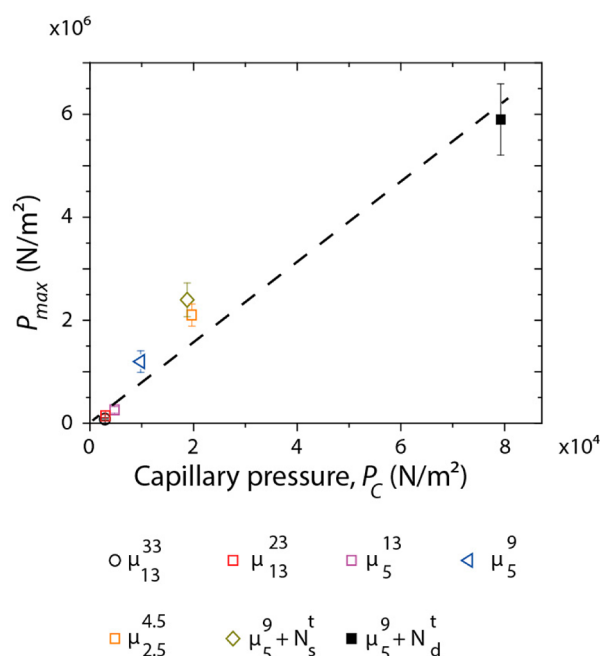

Figure 8a. (corrected) (a) Plot of P_{max}, that is, pressure caused by dimple formation below the drop, versus P_c for different substrates tested. The slope of the fit line is ∼80.