Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Supporting Information

Enhancement of surface nonwettability by grafting loops

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Influence of interaction strength between loops/hairs:

We vary the interaction strength between loops/hairs (ε_{LL}) to investigate its influence on nonwettability. Loops/hairs with large ε_{LL} tend to cluster with their neighbors. To do so, take the surface with regularly grafted loops of different rigidities ($k_{bend}=100k_BT/\sigma^2$ and $k_{bend}=400k_BT/\sigma^2$) as examples. For the surface grafted with flexible loops ($k_{bend}=100k_BT/\sigma^2$), the contact angle increases when ε_{LL} increases to a certain value ($\geq 1.5k_BT$) in Fig. S1(a). The large ε_{LL} is beneficial to the loop clustering, which increases the steric barrier of the wetting of the droplet and hence increases the contact angle. For the surface grafted with rigid loops ($k_{bend}=400k_BT/\sigma^2$), the contact angle has the similar tendency with flexible loops in Fig. S2(b). In this case, loops also tend to cluster together when ε_{LL} increases, leaving a large distance between loop clusters. The large distance helps to decrease the number of loop particles which contacts the droplet. As a result, the contact angle slightly increases.

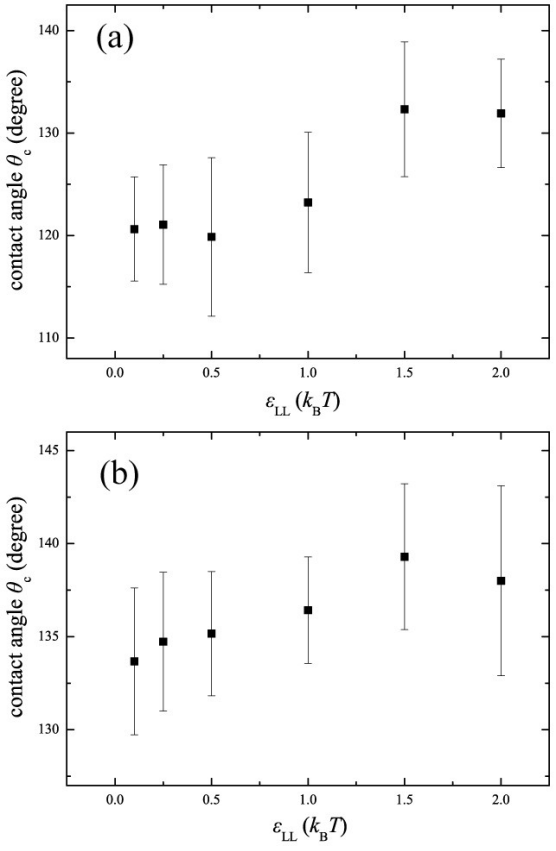

Fig. S1 The dependence of contact angle on the interaction strength between loops (ε_{LL}) for the surface with regularly grafted loops. Two different rigidities of loops are considered: (a) $k_{bend}=100k_BT/\sigma^2$; (b) $k_{bend}=400k_BT/\sigma^2$. The interaction strength between loops is tuned by changing ε_{LL}. Five samples are chosen to calculate the mean value and the error bar for each point.