Electronic Supplementary Material (ESI) for Soft Matter.

Supporting Information

Spatially Arranging Interfacial Droplets at the Oil-Solid Interface

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Table S1. Roughness of thiol-gold substrates.

Substrates	**Bare gold**	**-CH_3**	**-NH_3·Cl**	**-COOH**	**-OH**
Roughness/nm	2.59±0.40	2.37±0.12	3.41±0.61	4.8±0.16	3.71±0.41

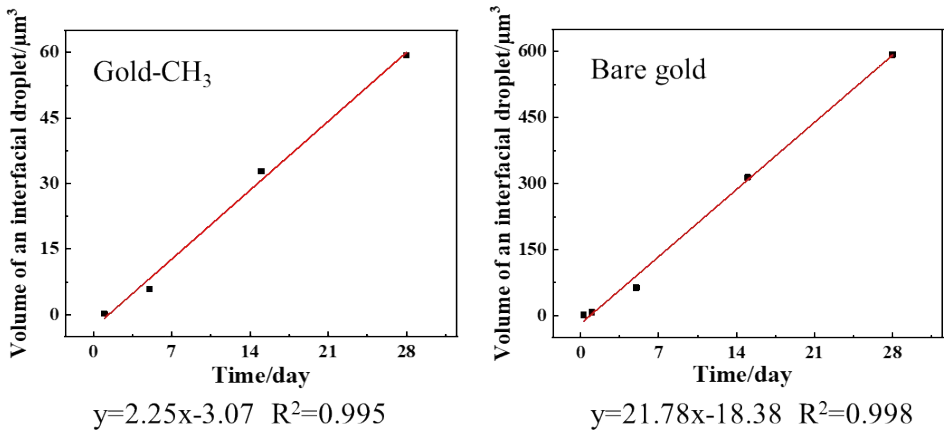

Fig. S1 Volume of interfacial droplets on hydrophobic substrates (gold-CH_3 and bare gold) changes with time.

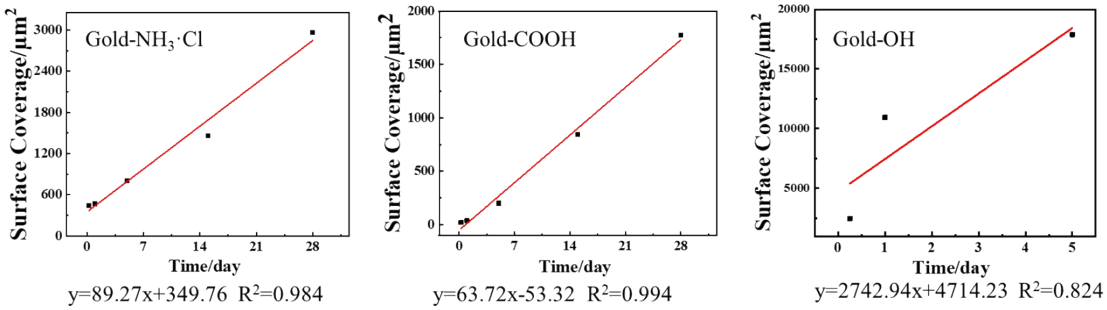

Fig. S2 Surface coverage of interfacial droplets on hydrophilic substrates (gold-NH_3·Cl, gold-COOH and gold-OH) changes with time.

We investigated the influence of hydrocarbon chain length of thiols on their ability of preventing interfacial droplets formation. We chose $HS(CH_2)_{11}CH_3$, $HS(CH_2)_{15}CH_3$ and $HS(CH_2)_{17}CH_3$ to form SAM on the gold substrate, n-hexadecane was used as oil phase, and the sample was incubated for the interfacial droplets formation for 5 days. Fig. S1 showed that there were relatively dense interfacial droplets on monolayers formed from $HS(CH_2)_{11}CH_3$, a few interfacial droplets on monolayers formed from $HS(CH_2)_{15}CH_3$ on gold and little interfacial droplets on monolayers formed from $HS(CH_2)_{17}CH_3$ on gold. This result indicated that the longer the hydrocarbon chain length of thiols, the better inhibition of interfacial droplets formation. Fig. S2 further confirmed that on the patterned surface, the monolayers formed from longer thiol molecules could more effectively prevent interfacial droplets formation, ended up with the patterned features in a much neat and clean exhibition.

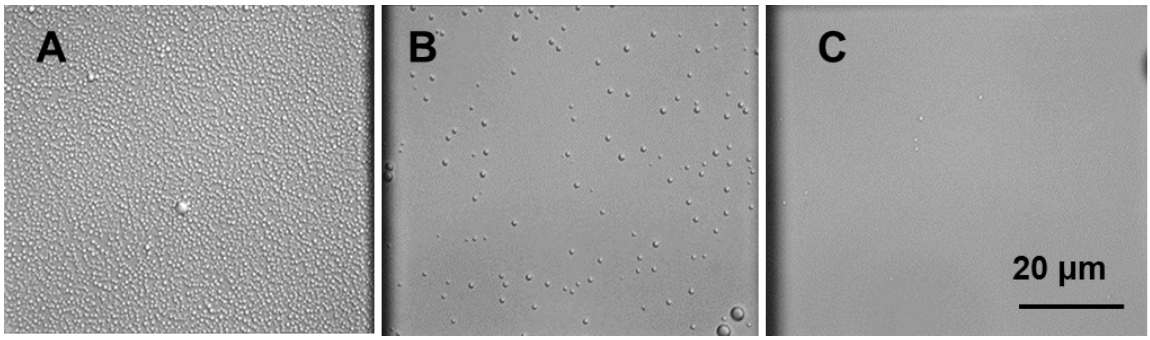

Fig. S3 The interfacial droplets formed between n-hexadecane and monolayers formed from (A) $HS(CH_2)_{11}CH_3$ (B) $HS(CH_2)_{15}CH_3$ and (C) $HS(CH_2)_{17}CH_3$ on gold, incubated in water for 5 days.

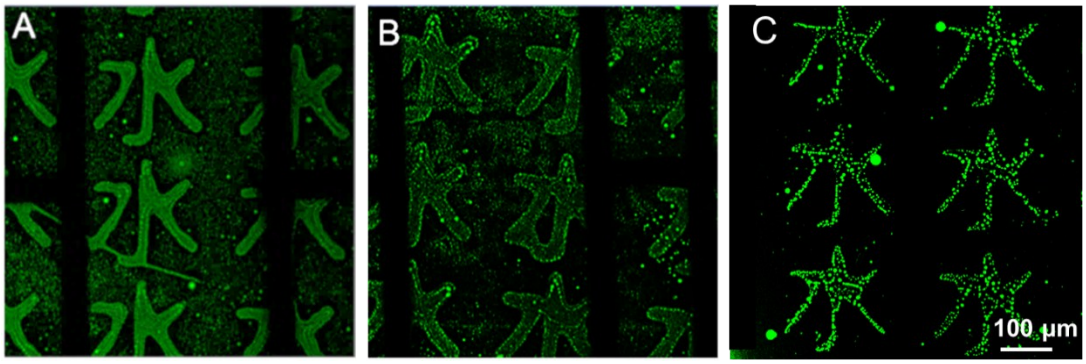

Fig. S4 The site with "水" character was modified with $HS(CH_2)_{11}OH$ and the background was modified with a monolayer formed from (A) $HS(CH_2)_{11}CH_3$ (B) $HS(CH_2)_{15}CH_3$ and (C) $HS(CH_2)_{17}CH_3$, respectively. The sample was characterized with an inverted fluorescent microscope after incubation in water for 5 days. A dark grid presented on the image was the gold grid used in this study, and blocked the light during imaging.