Electronic Supplementary Material (ESI) for New Journal of Chemistry.

Supporting materials

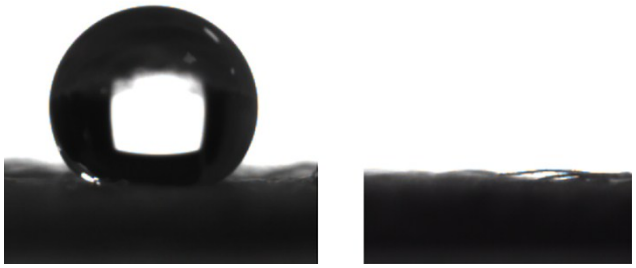

Fig. 1 Water contact angle and oil (cyclohexane) contact angle of D-NWFs.

Fig. 1 is the water contact angle (WCA) and oil contact angle (OCA, cyclohexane) images of D-NWFs. From Fig.1, the water contact angle of D-NWFs at neutral condition is 151°, and the oil droplet completely spread into D-NWFs with oil contact angle is 0°. These exhibit superhydrophobic and superolephilic properties of D-NWFs.

Fig. 2 is the illustration of the transformation of surface wettability in response to different pH conditions after modification with a mixed monolayer of $HS(CH_2)_{10}CH_3$ and $HS(CH_2)_{10}COOH$. Same as the mechanism of SO-NWFs fabrication, when a basic water droplet dropped on SC-NWFs, the carboxyl groups are deprotonated to $-COO^-$ and negatively charged which results in superhydrophilicity. While dropping acidic water droplet on the NWFs, the $-COO^-$ are protonated to -COOH, and the methyl group plays a dominate role, resulting to hydrophobicity. Fig. 3 is the water contact angle curves with pH change. The optimistic X_{COOH} is 0.55, and the wettability of SC-NWFs changes from superhydrophobicity to superhydrophilicity with an increase of pH. From above discussions, both two thiols can be used in the preparation of single pH-responsive switchable smart NWFs.

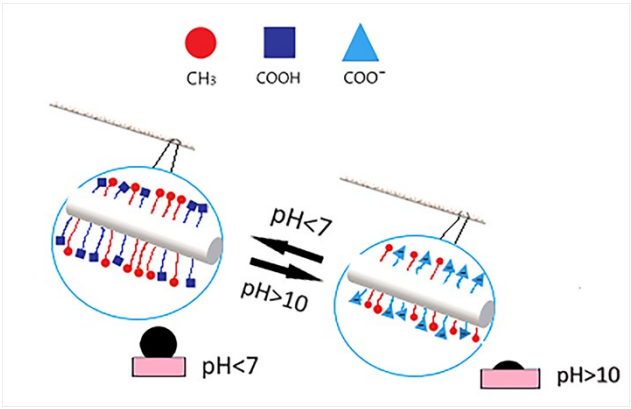

Fig.2 Illustration of the transformation of surface wettability in response to different pH conditions modification with a mixed solution of $HS(CH_2)_{10}COOH$ and $HS(CH_2)_{11}CH_3$.

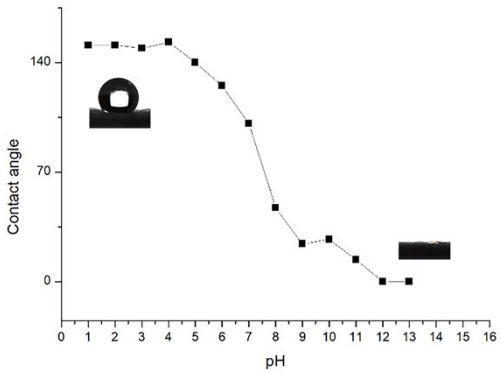

Fig.3 Water contact angle as a function of pH on NWFs that had been modified with a mixed solution of 55% $HS(CH_2)_{10}COOH$ and 45% $HS(CH_2)_{11}CH_3$.