

# Spray-coated Fluorine-Free Superhydrophobic Coatings with Easy Repairability and Applicability

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Fig.S1 Demonstration of the simple operation of spaying process for the formation of superhydrophobic coating

The XPS spectra in Fig.S2 demonstrate that the stacking nanostructures of these coatings are composed of  $\text{Cu}[\text{CH}_3(\text{CH}_2)_{10}\text{COO}]_2$ . In the full survey spectra of the coating (Fig.S2) there were only C, O, Cu elements. In the insert of Fig.S1 the C1s signal can be deconvoluted into two peaks: one at 288.2 eV due to the carbon of coordinated COO group; the other at 284.6eV due to the alkyl chain carbon. The signal of Cu 2p<sub>3/2</sub> coordinated was observed at 943.8eV also shown as in the insert of Fig S2 . The atom ratio of copper and carbon (coordinated COO) is about 1:2.

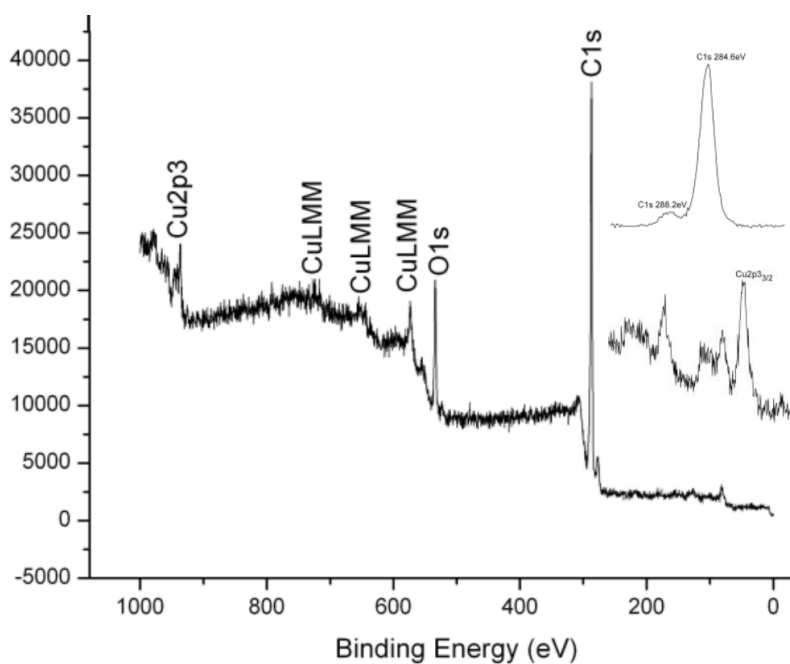


Figure S2. XPS spectrum of the spaying superhydrophobic coatings  $\text{Cu} [\text{CH}_3(\text{CH}_2)_{10}\text{COO}]_2$ . The insert are the C1s signal and that of Cu 2p3/2 coordinated respectively.

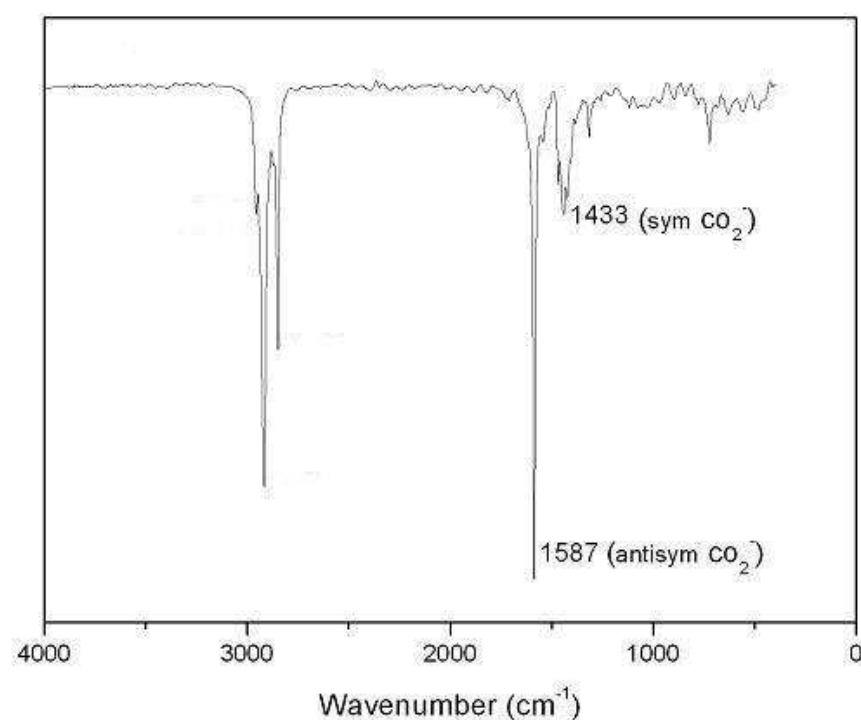


Fig. S3 FTIR spectrum of  $\text{Cu}(\text{CH}_3(\text{CH}_2)_{10}\text{COO})_2$  coatings.

The FTIR spectrum(see Fig.S3) of superhydrophobic coating with nanotexture shows asymmetric  $\text{COO}^-$  absorption at  $1544 \text{ cm}^{-1}$  and symmetric absorption at  $1461 \text{ cm}^{-1}$  (Fig. 3), which further confirmed the composition of.  $\text{Cu}[\text{CH}_3(\text{CH}_2)_{10}\text{COO}]_2$

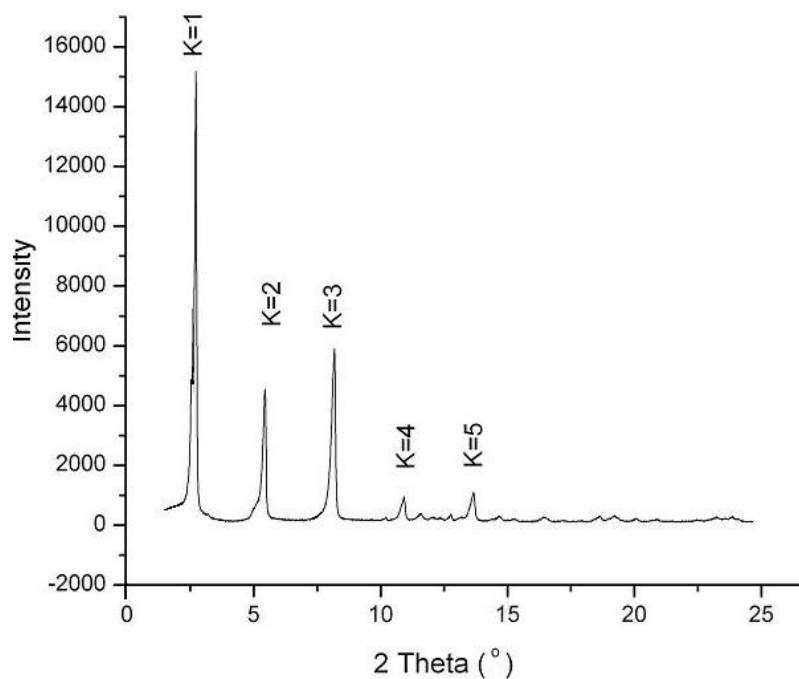


Figure S4. XRD of Cu  $[\text{CH}_3(\text{CH}_2)_{10}\text{COO}]_2$  coatings show a layer structure.

The small angle region diffraction pattern of the X-ray powder diffraction (XRD)(see Fig. S4) demonstrates that copper alkanoate prepared in this method have a layer structure with the same  $d$  spacing, as labeled with lines indexed to the interlayer spacing.