Supporting Information

Laminated Janus Membrane Fog Collector with Special Wettability

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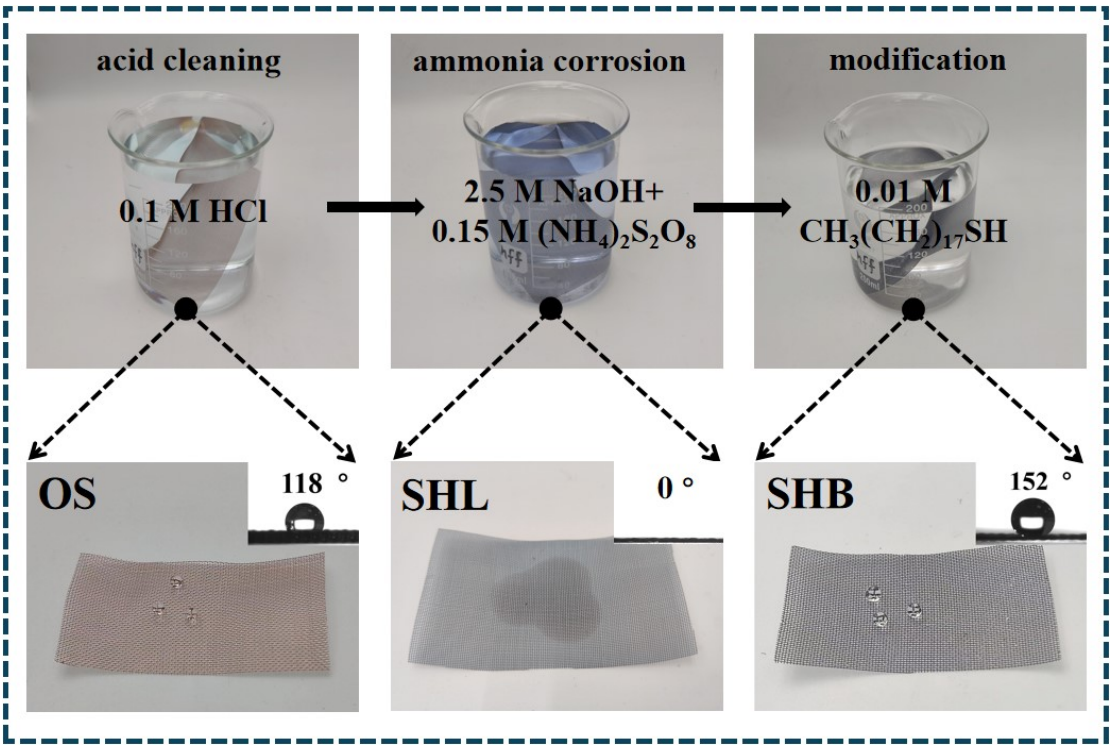

Figure. S1. Schematic diagram of the process of preparing superhydrophilic copper mesh by chemical etching and superhydrophobic copper mesh by thiol modification.

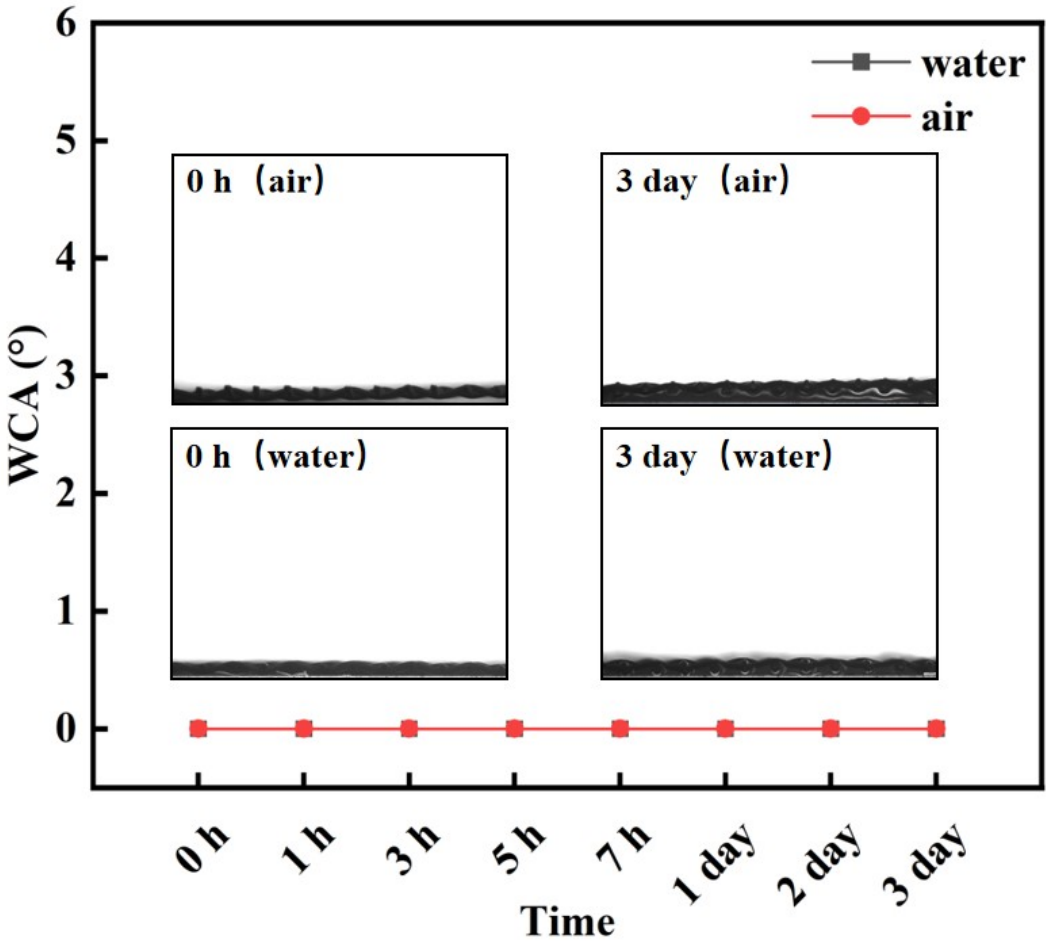

Figure. S2. Hydrophobic recovery of superhydrophilic mesh surfaces probing tests.

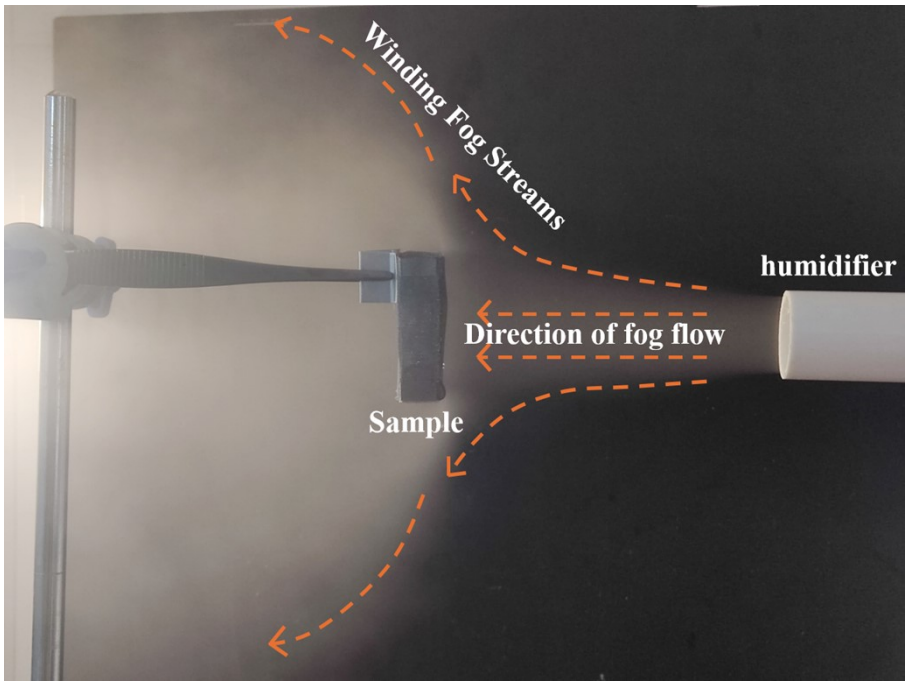

Figure. S3. Detour Flow Schematic.

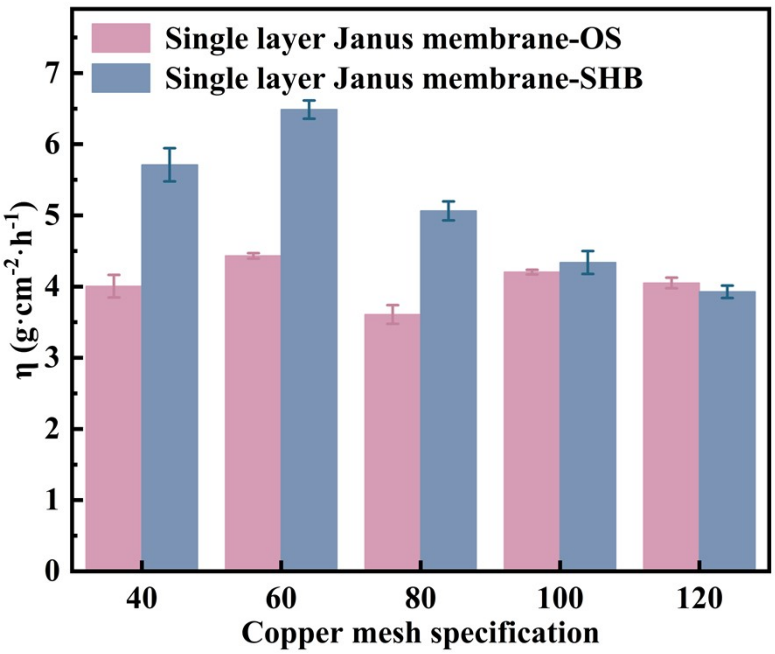

Figure. S4. Effect of copper mesh specification (grid aperture radius) on fog collection efficiency.

After cleaning, the surface of the original copper mesh was treated with ammonia etching to promote the growth of copper oxide on the surface, so as to modify it into a super hydrophilic surface. Then ODT was grafted to make -sulfhydryl (-SH) group superhydrophobic surface. The specific chemical reaction process is shown in the **Figure S5**.

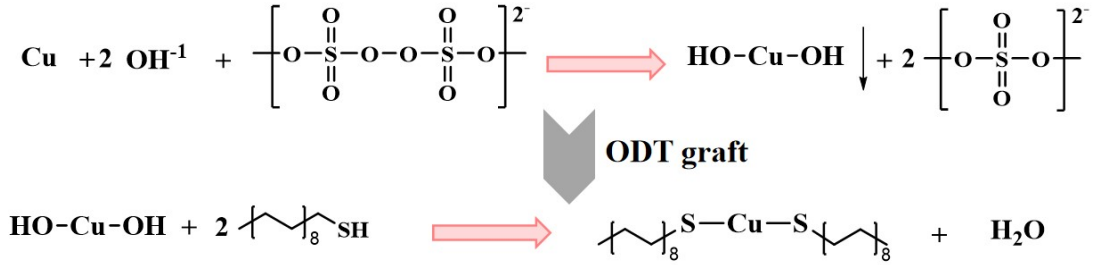

Figure. S5. Chemical reaction equations for ammonia-based etching and modification processes.

By analyzing EDS images of the copper mesh and EDS element normalization diagram of the local copper mesh (**Figure S6a-b**), it can be seen that the O content of SHL surface of the sample after ammonia etching of the original copper mesh OS increases significantly, and the surface is composed of uniformly distributed micro-nano needle

structures composed of $Cu(OH)_2$. In addition, after hydrophobic modification of SHL copper mesh, the carbon content on the surface of the sample increased significantly, and the uniform distribution of C and S elements on the surface of the copper mesh could be clearly observed in the EDS image of **Figure 4-f**, which further confirmed that mercaptan was successfully grafted to the surface of $Cu(OH)_2$, and SHB copper mesh was obtained.

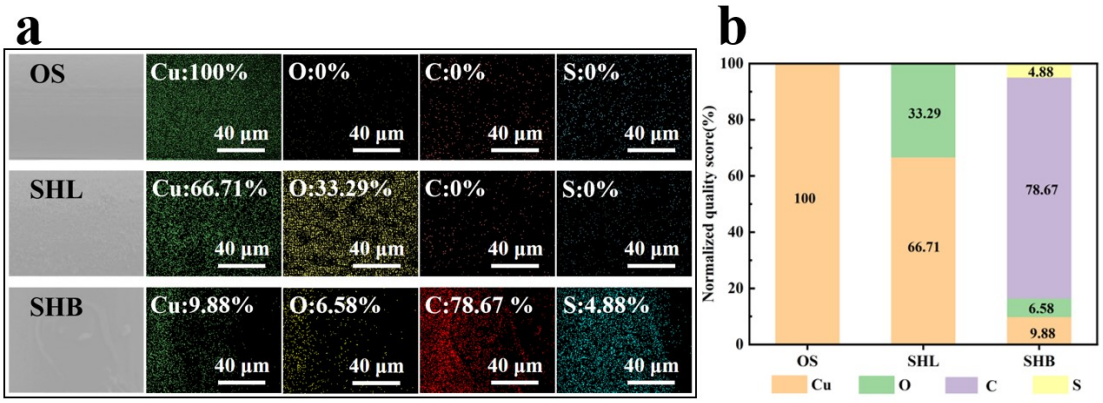

Figure. S6. (a)EDS element distribution of OS, SHL, SHB local image of copper mesh surface(b)Elemental normalization mapping of OS, SHL, SHB copper mesh surfaces.

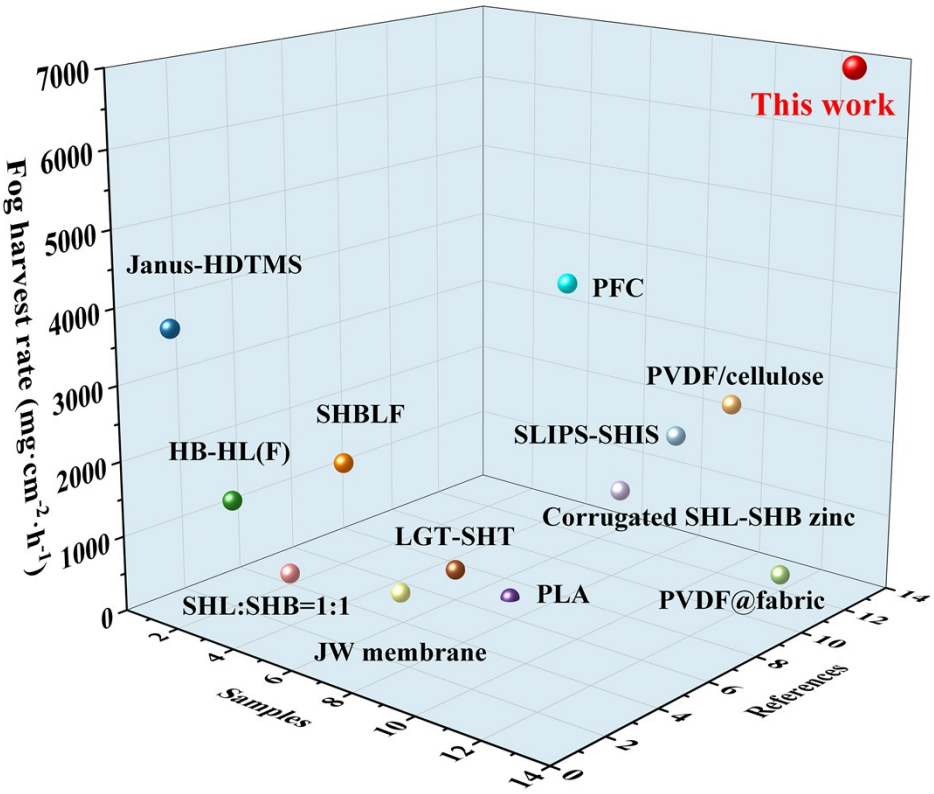

Figure. S7. Comparison of the catchment performance of the samples with other jobs [1-12].

Reference：

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