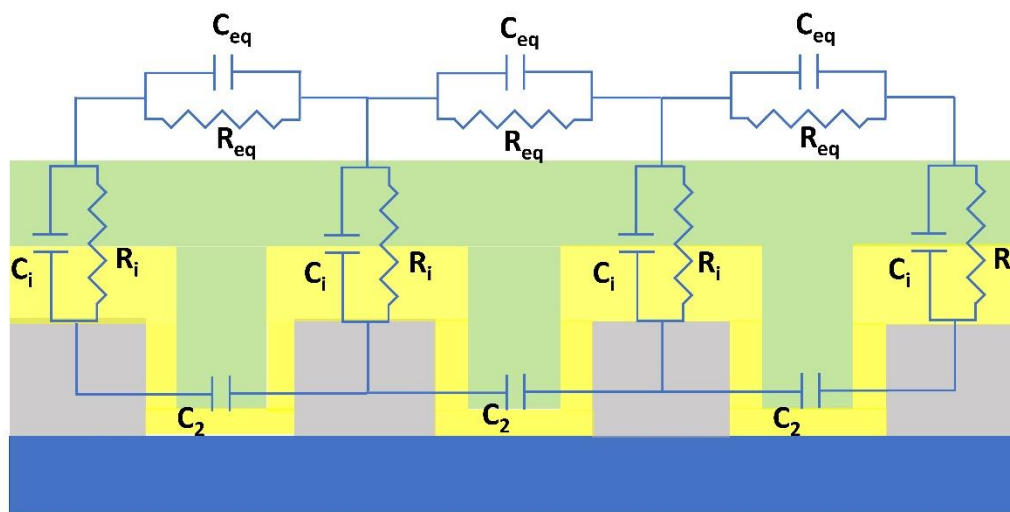


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The diagram shows an equivalent circuit for a transmission line. It consists of a series capacitor C_1 on the left. This is followed by a parallel combination of a resistor R_{eq} and a capacitor C_{eq} . After this parallel section, there is a series capacitor C_2 , and finally a load resistor R_i connected to the output terminals on the right.

Figure S1. (b) Equivalent circuit of the bi-layered sensor on IDT electrodes.

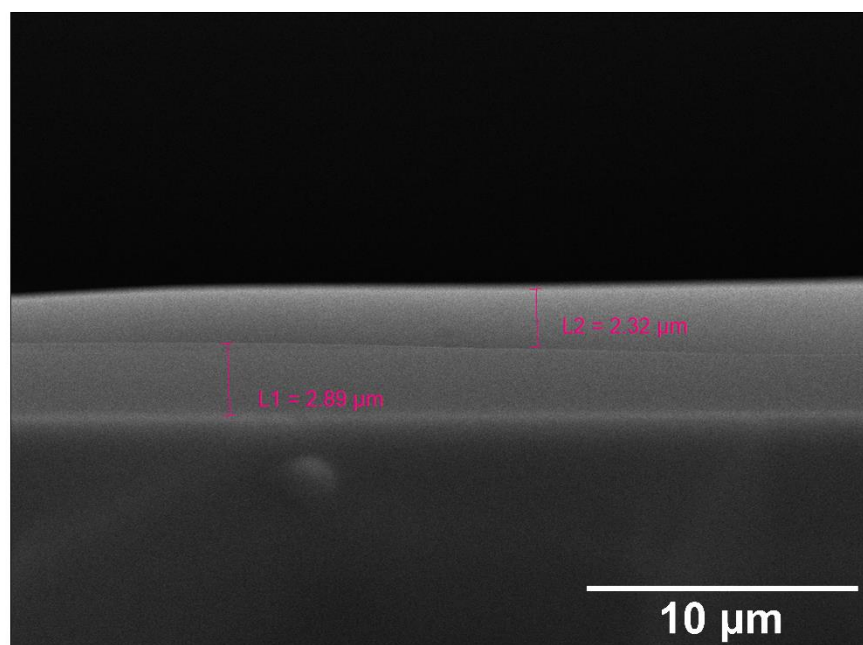


Figure S2. Cross-sectional image of the PVA film on the SiO₂ substrate.

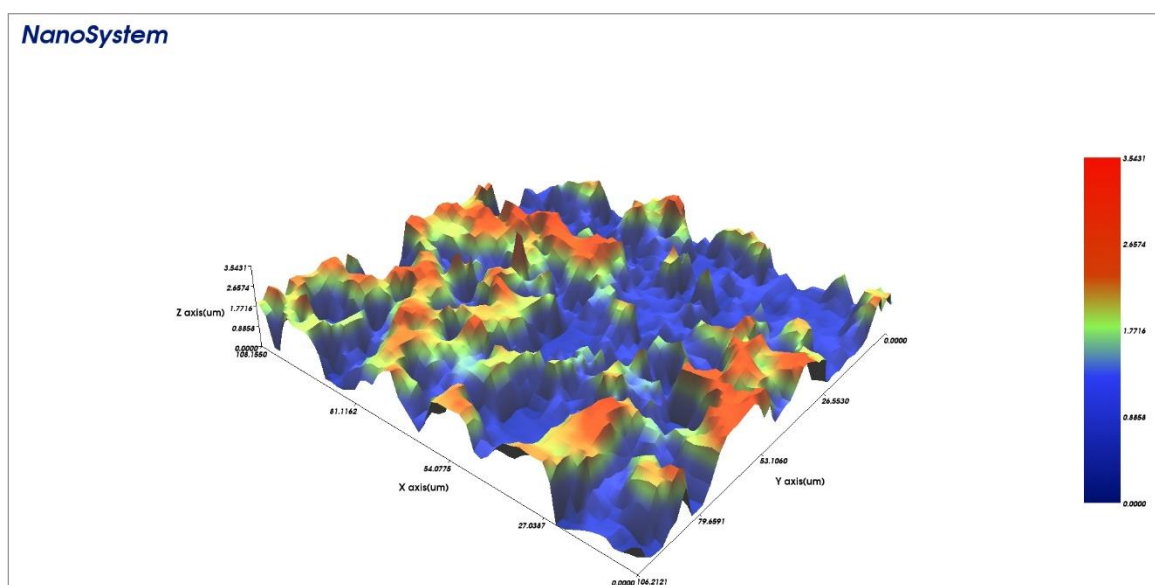


Figure S3. 3D Nano Profiling image of GF

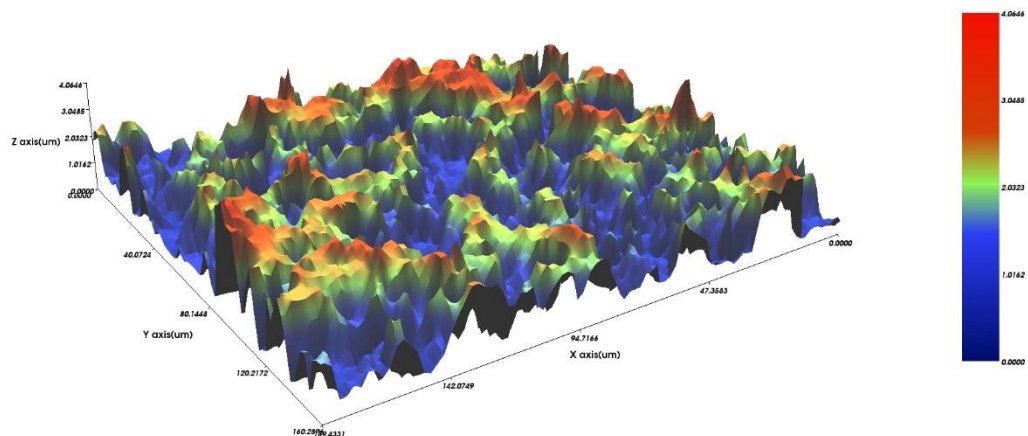


Figure S4. 3D Nano Profiling image of PVA/GF

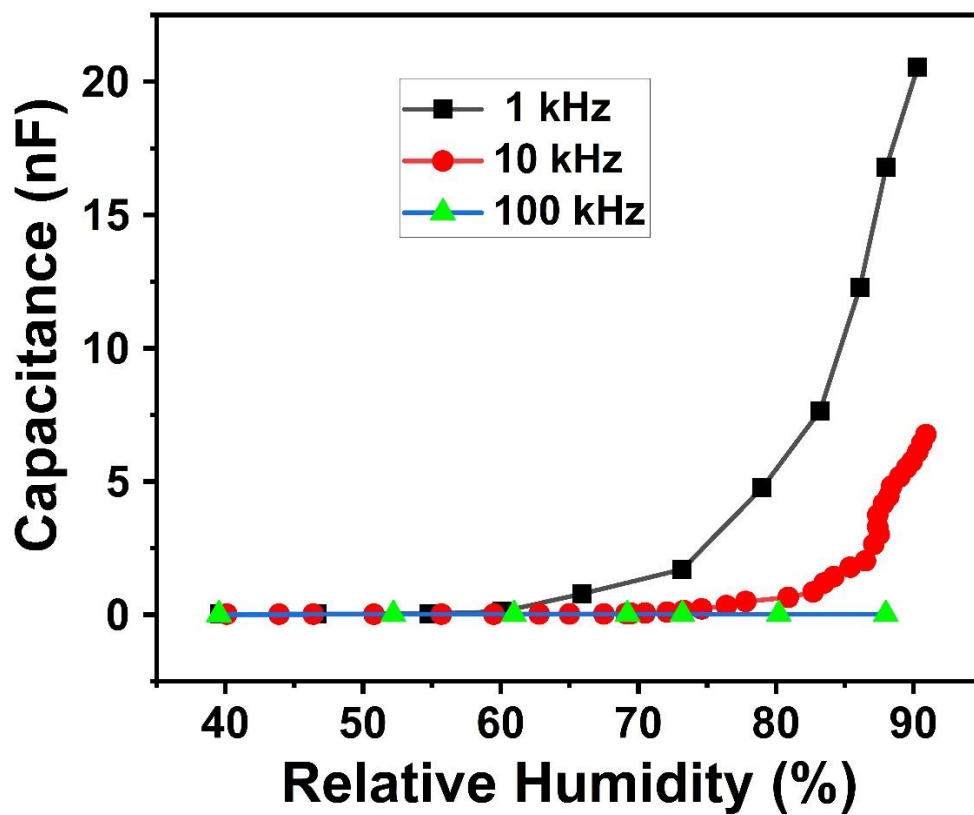


Figure S5. Comparison of impedance response at different test frequencies

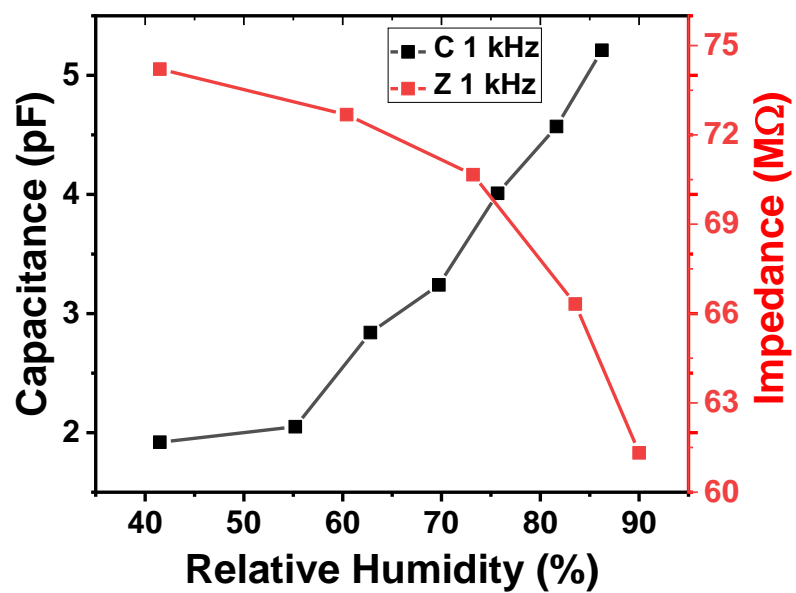


Figure S6. Impedance and Capacitance-based responses of GF alone as sensing layer at 1 kHz

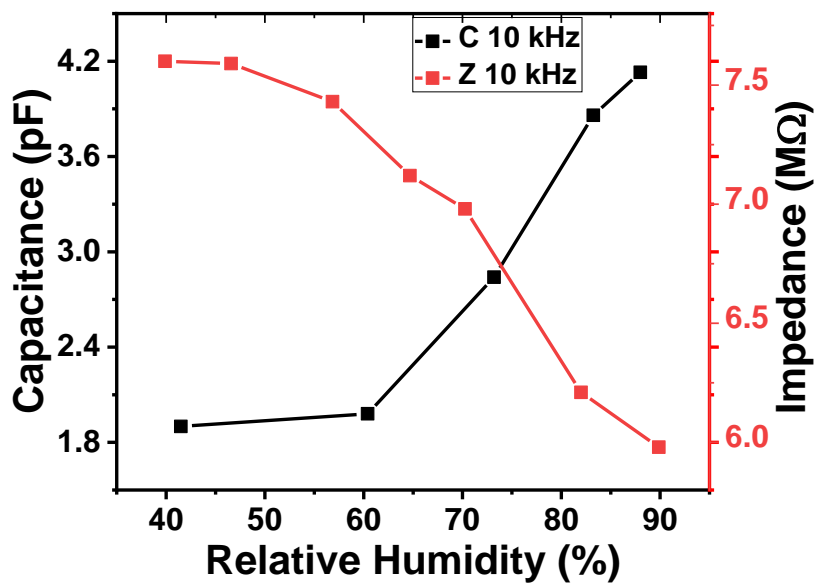


Figure S7. Impedance and Capacitance-based responses of GF alone as sensing layer at 10 kHz

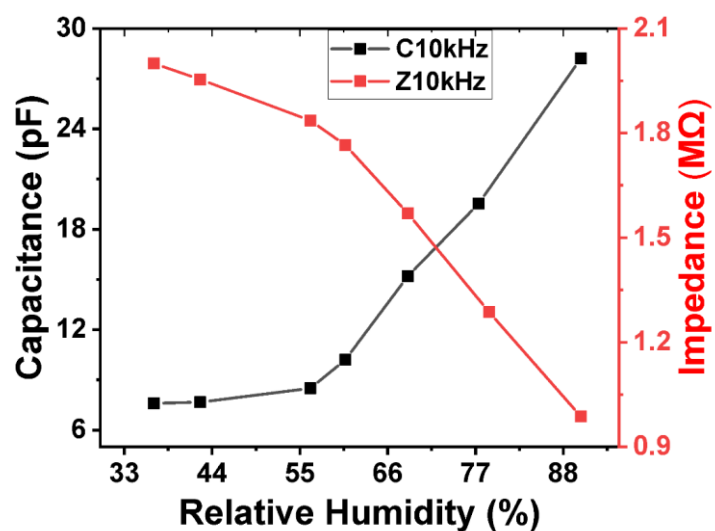


Figure S8. Impedance and Capacitance-based responses of PVA alone as sensing layer at 10 kHz

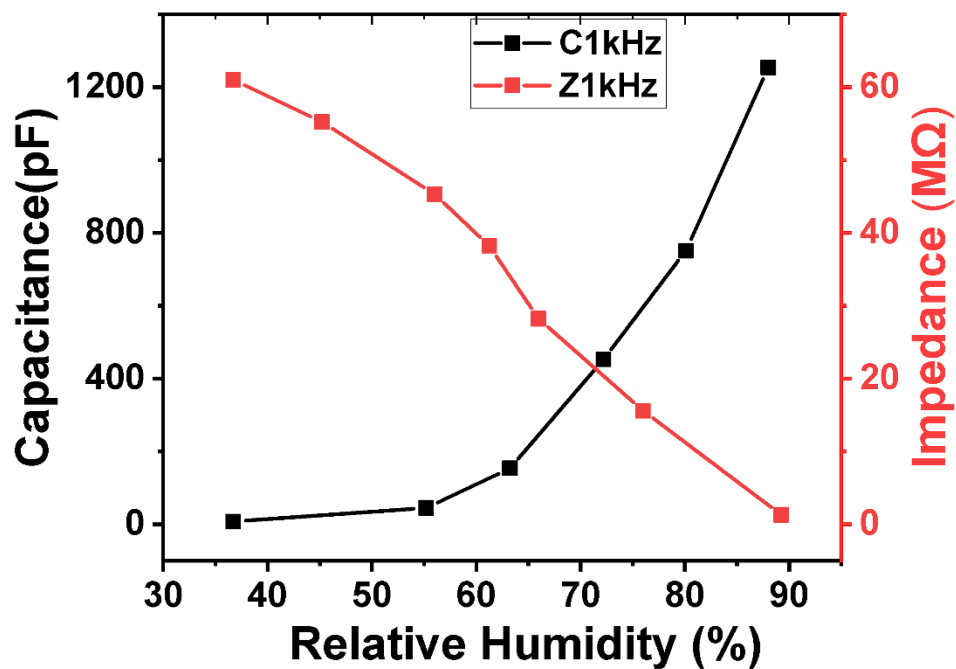


Figure S9. Impedance and Capacitance-based responses of PVA alone as sensing layer at 1 kHz

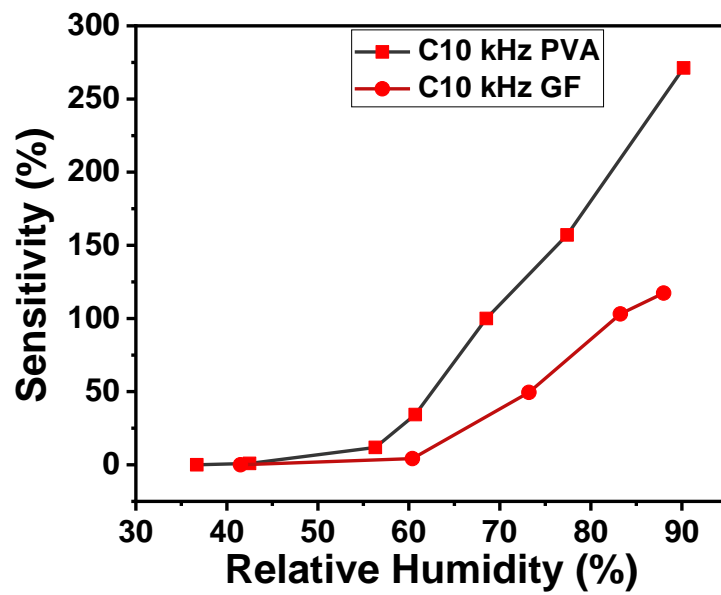


Figure S10. A comparison of sensitivity values Sensors fabricated with PVA and GF as separate layers alone

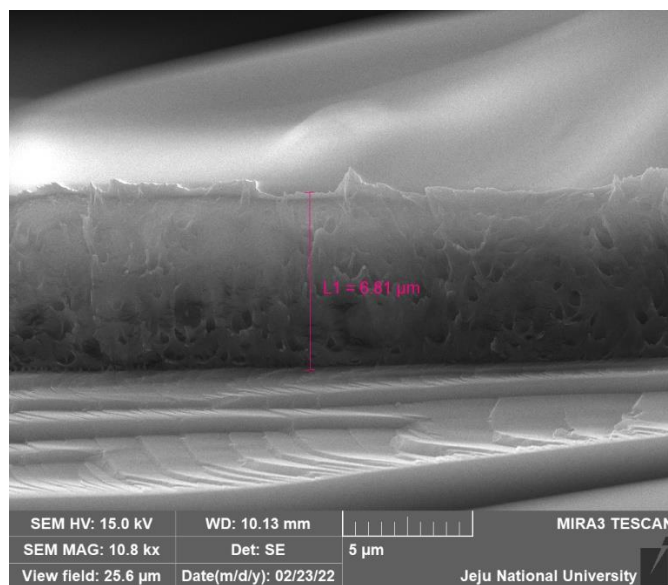


Figure S11. (a) Cross-sectional image of the thick PVA film on the SiO₂ substrate.

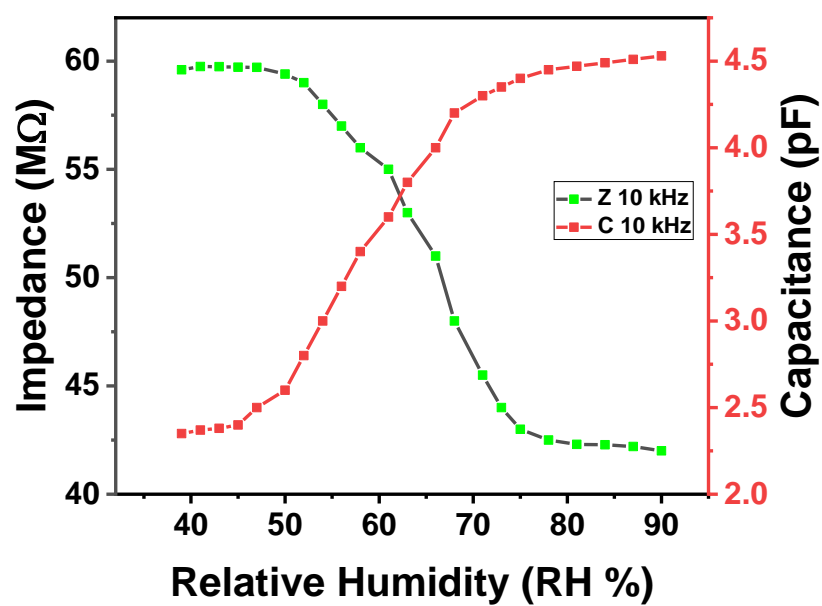


Figure S11. (b) Impedance and Capacitance-based responses of thick bi-layered PVA/GF as sensing layer at 10 kHz

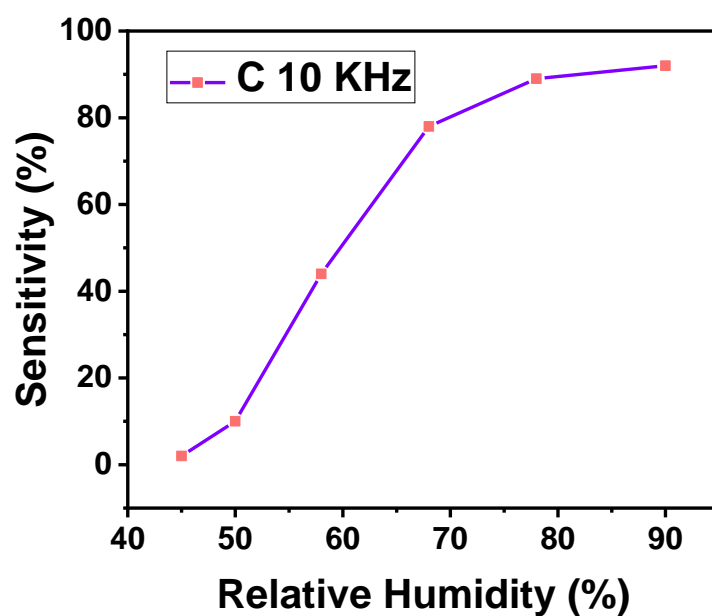


Figure S11. (c) Sensitivity of proposed of thick bi-layered PVA/GF as sensing layer at 10 kHz

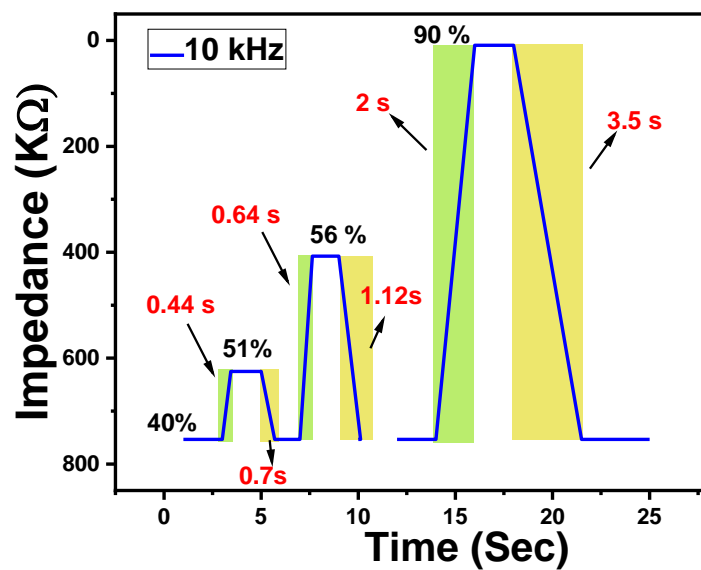


Figure S12. Impedance responses of PVA/GF composite under switching RH

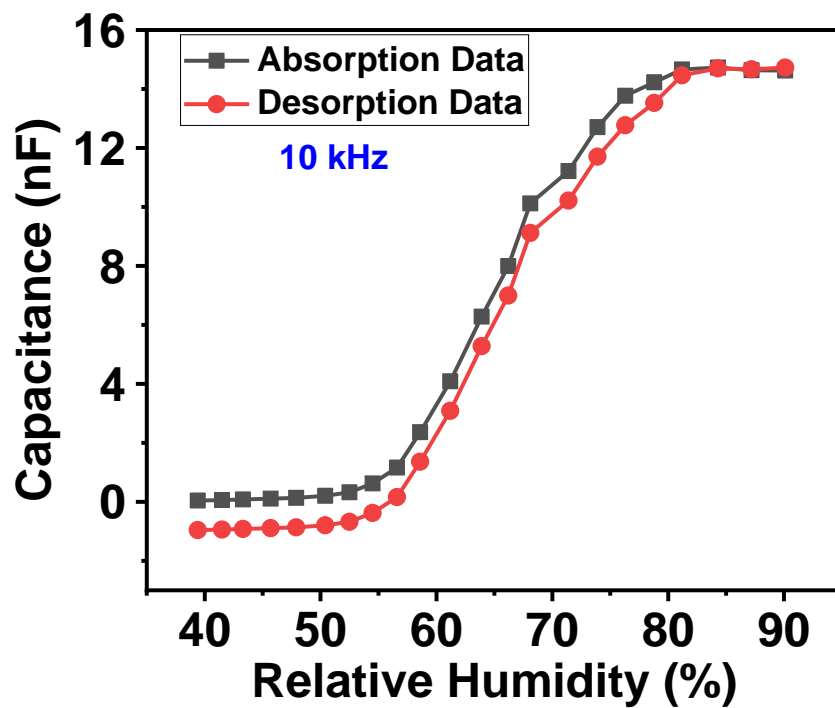


Figure S13. Hysteresis curve of adsorption and desorption behavior towards relative humidity at 10 kHz

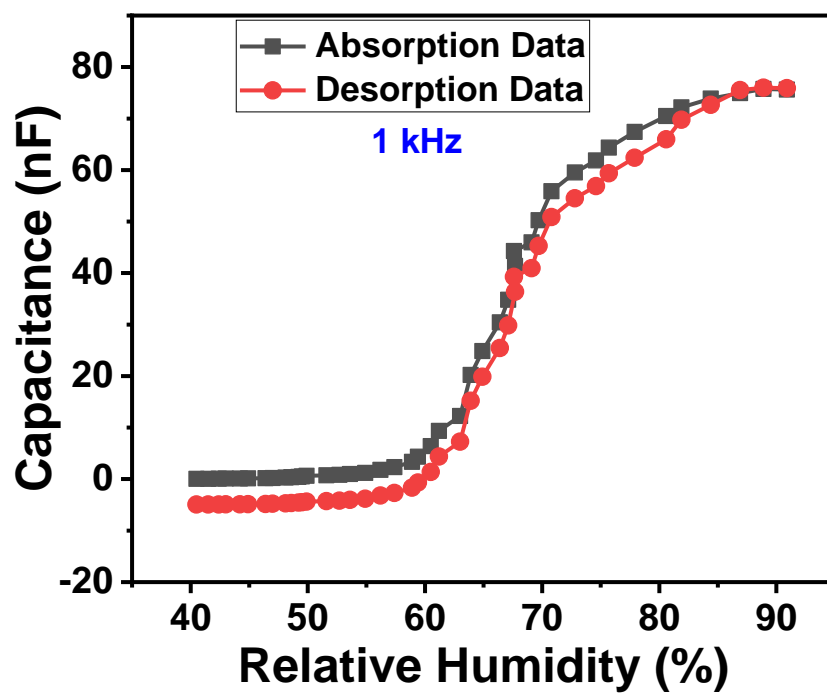


Figure S14. Hysteresis curve of adsorption and desorption behavior towards relative humidity at 1 kHz