

Supplementary material

Ultrahigh humidity sensitivity of NaCl-added 3D mesoporous silica KIT-6 and its sensing mechanism

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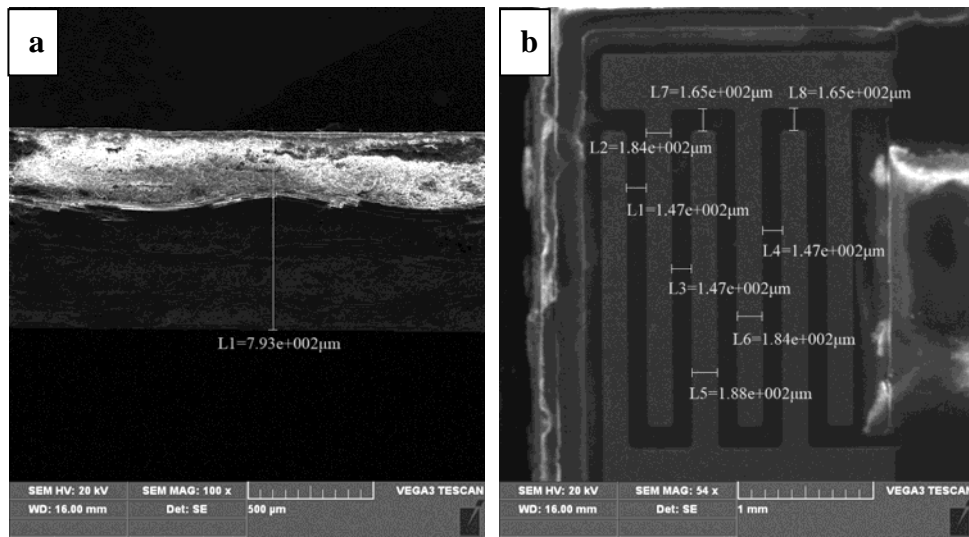


Fig. S1 Scanning electron micrographs of (a)cross side and (b)top side of the interdigitated electrodes(IDE).

The size of the electrode is 7 mm×5mm×0.8mm. In order to describe the size and dimension of IDE, we obtained scanning electron micrographs of the electrode by VEGA3-LMH (TESCAN Corporation, Czech) at low magnification. As shown in Fig. S1 (a), the thickness of the electrode is about 793 μm. According to Fig.S1 (b), the average transverse spacing and longitudinal spacing of the IDE are 147μm and 165μm, respectively. And the width of the main circuit in the IDE is about 185μm.

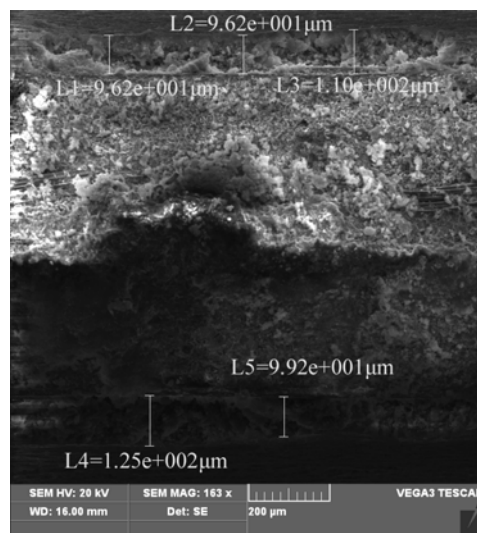


Fig. S2 SEM image of the electrode coated with humidity-sensing material.

Fig.S2 shows the crosscutting map of the electrode coated with humidity-sensing material. As can be seen from this SEM image, the average thickness of humidity-sensing films is about 100 μm.

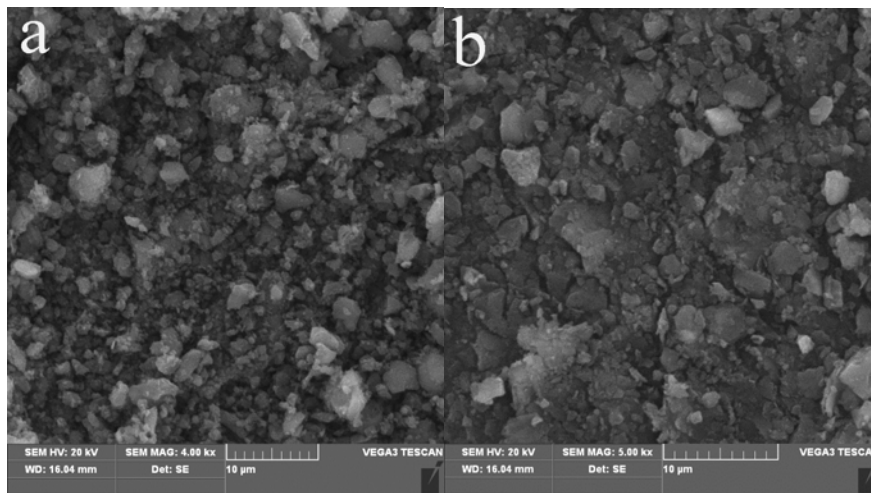


Fig. S3 SEM image of the (a) Na-KIT-6(0.2) and (b) KIT-6.

SEM image of Na-KIT-6(0.2) and pure KIT-6 are shown in Fig.S3. As can be seen from Fig.S3, both of them have irregular particle morphology. And it is difficult to observe the presence of sodium chloride from the SEM image.

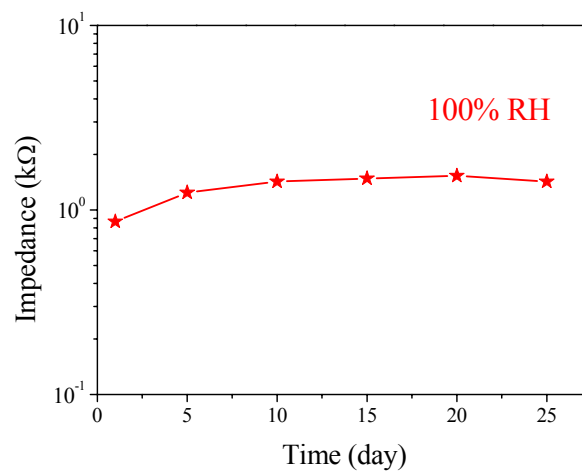


Fig. S4 Stability curve at 100% RH of Na-KIT-6(0.2)

In order to characterize the long term stability of Na-KIT-6(0.2) at 100% RH, we had been keeping the sensor in 100% RH atmosphere, and tested its impedance every five days. The results are shown in Fig.S4. As we can see from Fig.S4, with the increase of time exposed to 100% RH environment, the impedance of sensor rised slightly, but with the further growth of time, the impedance didn't change significantly. This result demonstrates that the sensor under 100% RH environment is relatively stable within 25 days.

Table S1. The content of Na element in Na-KIT-6(0.2). (the time interval between two tests is 20 days.)

Options Element	Point 1	Point 2	Point 3	Point 4	Point 5	Average
Na (first time) wt%	2.29	2.95	2.16	2.65	2.82	2.574
Na (second time) wt%	2.08	2.97	1.61	1.29	4.08	2.406