Supplementary Information

Facile Assembly of Flexible Humidity Sensor Based on Nanostructured Graphite/Zinc Oxide Coated Cellulose Fibrous Frameworks for Human Healthcare

Zaka Ullah^{a,*}, Ghulam M. Mustafa^a, Ali Raza^a, Adnan Khalil^b, Aboud Ahmed Awadh Bahajjaj^c, Rashida Batool^d, Nazmina Imrose Sonil^e, Irfan Ali^f, Muhammad Faizan Nazar^d

^a Department of Physics, Division of Science and Technology, University of Education, Lahore
54770, Pakistan

^b Institute of Physics, Khwaja Fareed University of Engineering and Information Technology, Rahim Yar Khan 64200, Pakistan

^c Department of Chemistry, College of Science, King Saud University, Riyadh 11451, Saudi Arabia

^d Department of Chemistry, Division of Science and Technology, University of Education, Lahore 54770, Pakistan

^e State Key Laboratory of Radio Frequency Heterogeneous Integration, College of Electronics and Information Engineering, Shenzhen University, Shenzhen 518060, China ^f Physics Characterization and Simulations Lab (PCSL), Department of Physics, School of Natural Sciences (SNS), National University of Sciences and Technology (NUST), Islamabad 44000, Pakistan

* Corresponding author, email: zaka.ullah@ue.edu.pk (Z. Ullah)



Fig. S1. Response of five humidity sensors for varying RH levels, fabricated in similar fashion.

RH		Average	Standard				
(%)	Sensor 1	Sensor 2	Sensor 3	Sensor 4	Sensor 5	Value	Deviation
11	7.28	7.74	6.51	7.41	6.95	7.18	0.47
24	6.36	6.50	5.80	6.41	6.10	6.23	0.28
43	5.07	5.52	4.59	5.12	4.70	5.00	0.37
62	4.15	4.59	3.76	4.34	3.91	4.15	0.33
84	2.51	3.08	1.51	2.80	2.30	2.44	0.60
97	1.04	1.36	0.74	1.13	0.90	1.03	0.23

Table S1. Average response and standard deviations in resistance of the five fabricated sensors based on G/ZnO (2B) for varying RH levels.



Fig. S2. Resistance of the graphite patterns employed using different graphite pencils, where each pattern was prepared five times to evaluate the stability of these patterns.

Pencil Model		Measurem	Average	Standard			
	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Value	Deviation
2B	18.31	19.12	17.69	18.13	19.01	18.45	0.60
4 B	13.73	14.42	13.32	13.71	14.35	13.91	0.47
6B	7.42	8.21	7.11	7.41	8.17	7.66	0.50
8B	3.12	3.89	2.96	3.07	3.73	3.35	0.42
10B	1.13	1.36	1.01	1.11	1.33	1.19	0.15

Table S2. Average resistance and standard deviations in resistance of the five prepared graphite patterns based on graphite pencils 2B, 4B, 6B, 8B, and 10B.