Supporting information

Synergistic Potential of MIL-101(Cr) and Reduced Graphene Oxide (rGO) in Designing High-Performance Ammonia Sensors

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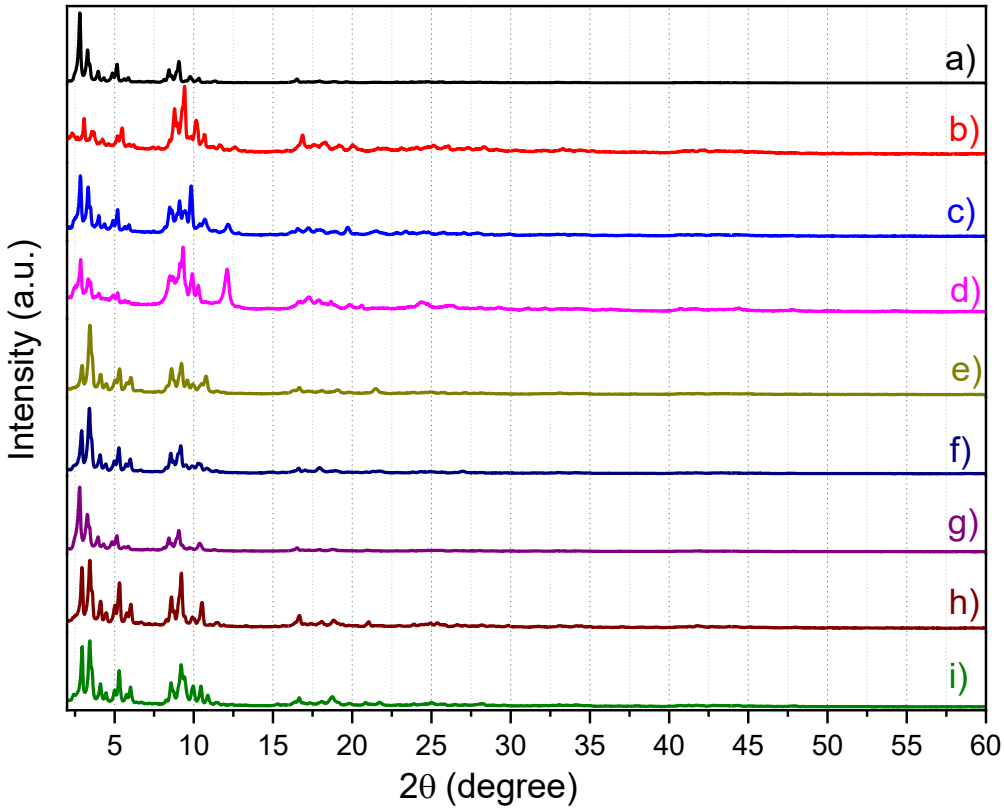

Figure S1. XRD of MIL-101(Cr) with different variations.

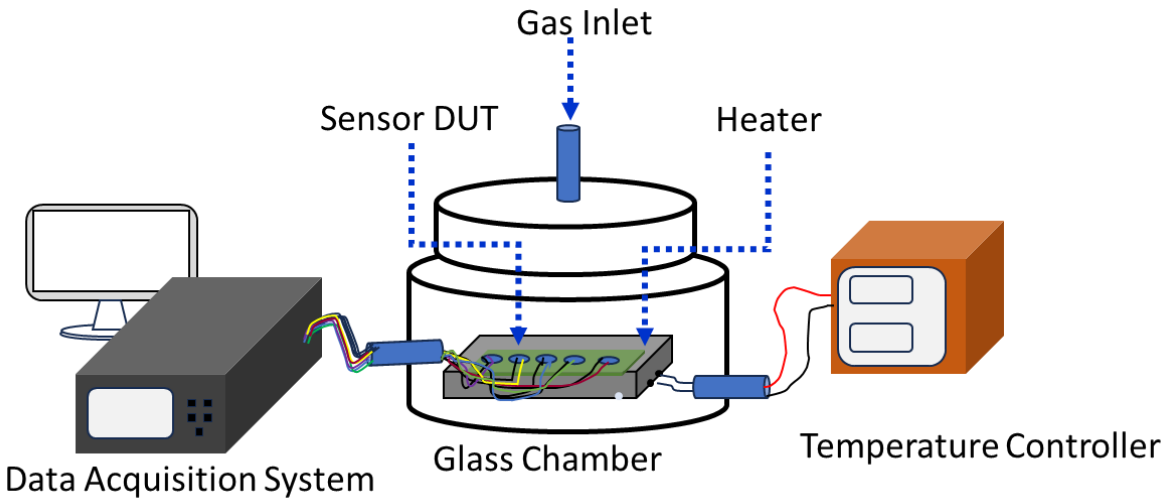

Figure S2. Schematic of the gas sensing measurement system (DUT- Device Under Testing).

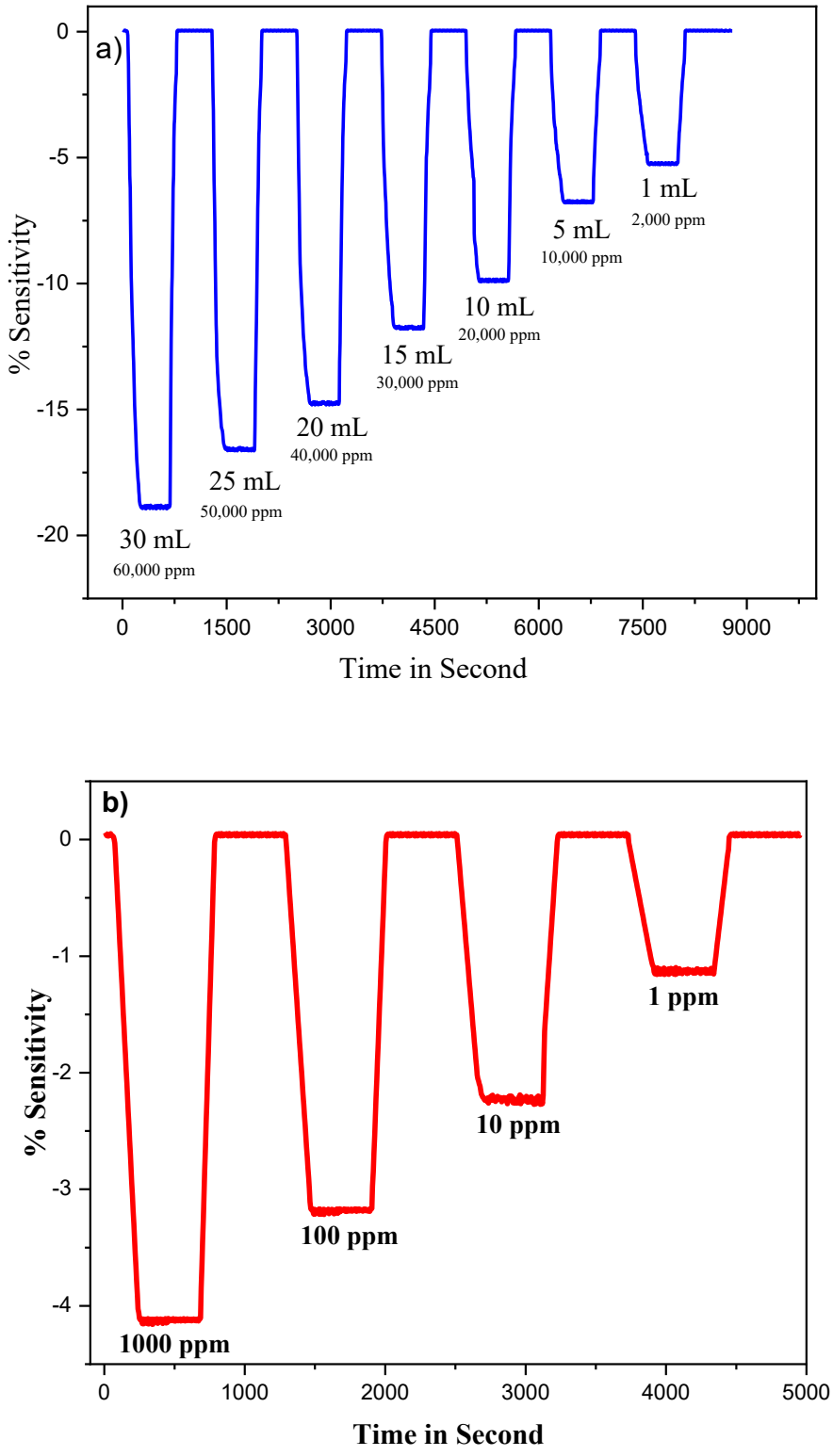

Figure S3. Ammonia sensing performance of 20 wt% rGO-MIL-101(Cr) composite after one year a) 60,000 ppm to 2000 ppm and b) 1000 ppm to 1 ppm.

Table S1: Comparison of the performance of ammonia gas sensors.

Sr. No.	Material	Detection (Detection Limit)	Response Time	Recovery Time	% Sensitivity/ Response	Selectivity	Stability / Reproducibility	Operating Temperature	References
1.	$SnO2/In_2O3$	1 ppm (0.1 ppm)	7 s	10 s	21	H_2S, C_2H_5OH, H_2, C_2H_2, C_6H_6, O_2, CH_4 and CO	80 days	RT	[1]
2.	Pd/SnO_2/RGO	100 ppm (5 ppm)	7 min	50 min	19.6 (7.6 for 5 ppm)	-	58 days	RT	[2]
3.	SnO	5 ppm	98 s	30 s	313	C_2H_5OH, CH_2Cl_2,C_6H_{14}, CH_3COOH	7 days	RT	[3]
4.	SnO_2 (type GGS10331)	5 ppm	<1 min	~few minutes	-	-	100 days	300–500°C	[4]
5.	NiO thin film	1000 ppm (< 5 ppm)	31 s	78 s	289	-	-	250°C	[5]
6.	Pt/NiO film	1000 ppm (10 ppb)	15 s	76 s	1278	-	-	300°C	[6]
7.	NiO-ZnO	100 ppm (50 ppb)	16 s	7 s	25	1-butanol, CH_2Cl_2, C_2H_5OH, CH_4	30 days	280°C	[7]
8.	TiO_2/GO/PANI	100 ppm (5 ppm)	32 s	17 s	110 (3.5 for 5 ppm)	SO_2, HCl, NO_2, CH_3OH, CO, CH_4, H_2, C_2H_5O, $N(CH_3)_3$	60 days	RT	[8]
9.	PANI	1250 – 10,000 ppm	2.27 min	9.73 min	5.56 Absorbance Unit	-	90 min	RT	[9]
10.	PANI networks	10 ppm (5 ppm)	108 s	83 s	9	ethanol, acetone, n-propanol	-	RT	[10]
11.	PANI/SWNT	10 ppm (50 ppb)	~few minutes	~few hours	2.44	-	1100 min	RT	[11]
12.	PANI-TiO_2-gold	50 ppm (1 ppm)	52 s	<3 min	123	NO_2, CO, H_2S, H_2, HCHO, SO_2, O_3	35 days	RT	[12]
13.	PANI/TiO_2	25 ppb	<1.5 min	-	0.55	-	-	RT	[13]
14.	PANI/Cu	50 ppm (1 ppm)	7 s	160 s	86	CO, CO_2, NO, CH_4	-	RT	[14]

15.	PANI/graphene	100 ppm (1 ppm)	50 s	23 s	11.33	-	9 days	RT	[15]
16.	Ppy-C@PANI-800	100 ppm (2 ppm)	59.5 s	25.6 s	224.53	CO_2, CO, NO_2, H_2, H_2S, HCHO	21 days	RT	[16]
17.	h-NiO-PANI	10 ppm (0.5 ppm)	149 s	257 s	43	TEA, Aniline, Methanol, Ethanol, Acetone, Acetonitrile, EA, Tetrachloromethane	7 days (5 Cycles)	RT	[17]
18.	Pt NPs@MIL-101-NH_2	0.7-600 ppm (0.58 ppm)	8 s	--	-	CO, H_2, H_2S, C_2H_6O, CH_4O, C_7H_8, C_3H_6O	6 cycles	RT	[18]
19.	NDC-Y-**fcu**-MOF@IDEs capacitive sensor	1 -100 ppm (100 ppb)	250 s	-	~3.7 for 10 ppm	CH_4, NO_2, H_2, C_7H_8	15 days	RT	[19]
20.	Cu–Fe PBA@IDEs capacitive sensor	75-1000 ppb (3.8 ppb)	235 s	220 s	~11 for 500 ppb	CH_4, NO_2, H_2S, CO_2	18 days	RT	[20]
21.	Zn-BDC@rGO	20 ppm	60 s	120 s	-	CO, SO_2	30 days	RT	[21]
22.	rGO-MIL-101(Cr)	2,000-60,000 ppm (1 ppm)	105 s	83 s	-18.87	Acetone, chloroform, toluene, benzene, methanol, hydrogen	1 year	115°C	This work

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