Cross Response of LARK-1 i-C4H8 to HC Gases

LARK-1 i-C4H8 (isobutylene) is an NDIR sensor developed by Promisense, which can be used to detect the concentration of various HC gases, including benzene, toluene, xylene, methanol, n-hexane and so on. In other words, HC gas sensors could be calibrated with isobutylene.

It is necessary to know the cross sensitivity of corresponding VOC gas to isobutylene, in order to detect the concentration of HC gases with LARK-1 i-C4H8. Therefore, we measured the cross response of LARK-1 i-C4H8 to HC gases and calculated the cross sensitivity. And cross sensitivity data are presented in this note directly. It should be noted that data in this note is only valid for LARK-1 i-C4H8 sensor developed by Promisense.

We made a variety of HC gases cross response experiments. As shown in table 1, we perform basic information of HC gases for users to consult, such as the name, chemical formula, CAS R.N., and lower explosion limit. If the VOC gas you need to detect is not listed in table 1, you can also contact us.

Table 2 is a summary table of the data for the cross response of HC gases to LARK-1 i-C4H8. Each HC gas has a corresponding cross sensitivity which is the reading of LARK-1 i-C4H8 divided by HC gas concentration. You can directly use the cross sensitivity in table 2. The HC gas to be tested is pumped into LARK-1 i-C4H8 sensor, and the HC gas concentration is the reading of LARK-1 i-C4H8 divided by the cross sensitivity found in table 2.

Table 1. Basic Information of HC Gases

Name	**Chemical Formula**	**CAS R.N.**	**Molecular Weight**	**Lower Explosion Limit (%VOL)**	**Saturated Vapor pressure(kPa) @25℃**
Benzene	C_6H_6	71-43-2	78.11	1.20	12.69
Methylbenzene	$C_6H_5CH_3$	108-88-3	92.14	1.10	3.90
Paraxylene	$C_6H_4(CH_3)_2$	106-42-3	106.17	1.10	1.17
Anhydrous Ethanol	C_2H_5OH	64-17-5	46.07	3.50	7.83
Methanol	CH_3OH	67-56-1	32.04	6.00	16.85
n-Hexane	$CH_3(CH_2)_4CH_3$	110-54-3	86.18	1.10	20.16
Acetic Acid	CH_3COOH	64-19-7	60.05	4.00	2.10
Heptane	$CH_3(CH_2)_5CH_3$	142-82-5	100.20	1.10	6.09
Isopropanol	$(CH_3)_2CHOH$	67-63-0	60.06	2.00	4.33
Acetone	CH_3COCH_3	67-64-1	58.08	2.50	30.66
Propionaldehyde	C_3H_6O	123-38-6	58.08	2.30	34.40
Decane	$C_{10}H_{22}$	124-18-5	142.28	0.60	0.18
Formaldehyde	HCHO	50-00-0	30.03	7.00	/

Table 1 Continued. Basic Information of VOCs

Name	Chemical Formula	CAS R.N.	Molecular Weight	Lower Explosion Limit (%VOL)	Saturated Vapor pressure (kPa) @25℃
Ethyl Acetate	$C_4H_8O_2$	141-78-6	88.11	2.0	13.33
Hexamethyl Disiloxane	$C_6H_{18}OSi_2$	107-46-0	162.28	0.6	5.6
Dimethylformamide	C_3H_7NO	68-12-2	73	2.2	0.5
Methane	CH_4	74-82-8	16	5.0	15.0
Ethane	C_2H_6	74-84-0	30	3.0	53.32
Ethylene	C_2H_4	74-85-1	28.06	2.7	36
Propane	C_3H_8	74-98-6	44	2.1	9.5

Table 2. Cross Sensitivity of LARK-1 i-C4H8 to HC Gases

Name	Concentration (ppm)	Reading(ppm)	Cross Sensitivity
Benzene	1000	909	0.91
Methylbenzene	1000	935	0.94
Paraxylene	1000	1248	1.25
Anhydrous Ethanol	1000	748	0.75
Methanol	1000	596	0.60
n-Hexane	1000	1405	1.40
Acetic Acid	1000	2347	2.35
Heptane	1000	1359	1.36
Isopropanol	1000	1045	1.05
Acetone	1000	372	0.37
Propionaldehyde	1000	494	0.49
Decane	1000	1421	1.42
Formaldehyde	46	33	0.71
Ethyl Acetate	1000	719	0.72
Hexamethyl Disiloxane	1000	1227	1.23
Dimethylformamide	1000	288	0.23
Methane	1000	553	0.55
Ethane	1000	1330	1.33
Ethylene	1000	313	0.31
Propane	1000	1514	1.51