What are reducing gases?

Learn about gases like VOCs and H_2, which Sensirion's SGP4x sensors are sensitive towards

Harmless VOC sources	Harmful VOC sources
breath, cosmetics, perfumes, drinks and food	carpets, furniture, building materials, paints, lacquers, solvents, cleaning supplies, cooking, plastics, adhesives, glues, arts and craft supplies

Reducing gases like to react with oxygen

Simply speaking, reducing gases are compounds which react with atmospheric oxygen catalyzed on heated surfaces, such as the metal oxide layer of SGP4x sensors. Some examples of reducing gases are hydrogen (H_2), volatile organic compounds (VOCs), carbon monoxide (CO) and methane (CH_4). Typical VOC MOX sensors, like the SGP4x products, react only to H_2 and VOCs.

Volatile organic compounds are the number one indoor gas pollutant

Volatile refers to compounds that like to be in the gas phase (as opposed to the solid or liquid phase). As a result, they tend to accumulate in indoor air, so VOC concentrations indoors are much higher than outdoors.

There are numerous sources of VOCs in indoor air environments, some – but not all – of which are harmful gases.

Organic in this context means any gaseous compound that contains carbon–hydrogen bonds. Thus, the list comprises hundreds of substances. Prominent examples are ethanol and formaldehyde. Ethanol can be considered a harmless gas in indoor air, but formaldehyde is classified as unhealthy even at very low concentrations. Therefore, the term VOC does not equate to harmful.

Many products in our daily lives off-gas VOCs, so indoor VOC concentrations are higher when more (and newer) off-gassing sources are in the room and the ventilation in the room is poorer. Such sources include cleaning supplies, plastics, paint and lacquers, adhesives and glues, solvents, cosmetics and perfumes, furniture, carpets, building materials and arts and craft supplies – but also fumes from cooking, food and drinks and even the air we exhale. Also note that humans exhale H_2 gas as well, so a typical VOC MOX sensor will also react to this gas even if the concentration of VOCs is low.

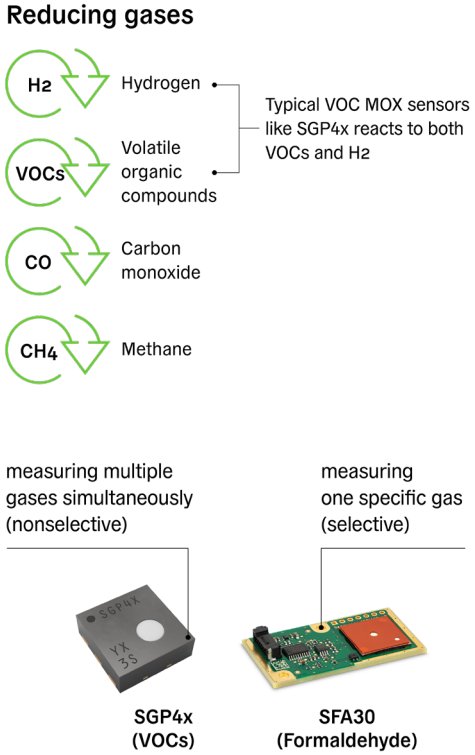
SGP4x sensors greatly extend the perception of the human nose

Although the human nose is a great gas detector, it fails at detecting odorless gases or those which are found at low concentrations. In this respect, SGP4x sensors add great value to indoor air quality applications by monitoring most VOCs at the same time with the VOC Index signal. However, the sensors cannot distinguish between individual VOCs. For measuring a specific VOC, Sensirion offers additional solutions, such as the SFA30 for formaldehyde detection.

Further reading

What is Sensirion's VOC Index?

Is it possible to map the output of a MOX sensor to a norm?



Typical VOC MOX sensors such as Sensirion's SGPxx sensors are sensitive towards most VOCs and human related H_2 (top). For selective gas detection, products like SFA30 should be used (bottom).

SENSIRION