

What are oxidizing gases?

Learn about gases like NO_x and O₃ Sensirion's SGP41 sensor is sensitive towards

NO_x sources

Outdoor NO_x entering house through window (factory emissions and nearby traffic), gas powered cooking stoves, cigarette smoking, gas powered water heaters, candles and wood stoves

NO_x are the main indoor gas pollutants beside VOCs

Simply speaking, oxidizing gases are highly reactive gases that contribute more oxygen to combustion processes than normal air does. The most common examples are nitrogen oxides (NO_x), ozone (O₃) and oxygen (O₂) itself. NO_x mainly refers to nitric oxide (NO) and nitrogen dioxide (NO₂), which both co-exist. Highly reactive means that they are unstable when they come into contact with surfaces. Therefore, oxidizing gases are usually much less abundant indoors compared to volatile organic compounds (VOCs). However, if there is a constant source, indoor concentrations can reach harmful levels.

In indoor air environments, NO_x gases are the most relevant pollutants out of the oxidizing gases. Any long-term exposure at even small concentrations can be considered harmful.

WHO Global Air Quality Guidelines, ISBN 978-92-4-003422-8

Sources of NO_x are always related to combustion processes, such as cooking on a gas-powered stove, smoking a cigarette, burning candles, using a fireplace or heating water in a gas-fired residential boiler. O₃ is usually emitted from devices (e.g., a sterilizer), which either produce O₃ directly (via a spark) or as a by-product (via UV light). In closed rooms, O₃ decomposes rather quickly within 15 minutes, while NO_x gases can remain in the air for several hours, thus posing the higher risk to human health indoors.

Oxidizing gases are hazardous even at small concentrations

Highly reactive also means that oxidizing gases are powerful irritants that harm the lungs and mucous membranes when inhaled – even at low concentrations. In contrast to VOCs, oxidizing gases are also an outdoor problem: human activities (industry or motorized traffic) lead to elevated levels of O₃ and NO_x in outdoor air in or near cities. In this way, oxidizing gases may also enter through an open window. In 2021, the World Health Organization updated its guidelines regarding air quality, greatly lowering the recommended values for exposure to O₃ and NO_x.

SGP41 greatly extends the perception of the human nose

The human nose is not able to reliably warn us when these very low thresholds are exceeded, let alone exceeded for a long time. In this respect, SGP41 adds great value to indoor air quality applications by monitoring mainly NO_x with its NO_x Index signal, in addition to VOCs.

Further reading

[What is Sensirion's NO_x Index?](#)



NO_x indoor gas pollutants may cause or facilitate various diseases mainly related to respiratory issues when exposed over a prolonged time.