

Device for the simultaneous measurement of gases that reduce indoor air quality

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VTT Technical Research Centre of Finland Ltd has developed a real-time and reliable device that can be used to measure ammonia and formaldehyde concentrations particularly in indoor air simultaneously, unlike with the meters currently in use. It is also suited to the measurement of emissions reducing outdoor air quality in city centres and traffic.

"The [device](#) is capable of measuring the concentrations of several gases reliably and continuously with a sensitivity of less than 10 ppb, and it reports the results rapidly in just a couple of minutes or, if necessary, in seconds. The prototype can be flexibly modified for different purposes," says senior scientist Timo Rajamäki from VTT.

One ppb equals one billionth of the gas molecules in the air, so we are talking about extremely minute concentrations. In Finland the limit value for [indoor air](#) gas content that does not cause observable health hazards are around 20-30 ppb for ammonia (30-40 micrograms per cubic metre), and around 40-125 ppb for formaldehyde (30-100 micrograms per cubic metre), depending on the indoor climate class.

Emissions from interior design and construction materials are a common cause of indoor air problems. The most typical sources of formaldehyde and ammonia in indoor air are ceiling and wall levelling compounds, adhesives and plastic mats, and particularly the adhesives and solvents used in them.

The measurement method of VTT's sensitive and real-time device is based on the absorption of light from a carefully selected laser into the examined substance. Light travels through the measured air in a multireflection cuvette, achieving several tens of meters of measurement distance and a sufficient sensitivity even with concentrations this small. The computer-controlled device sucks the gas to be measured using its own sampling pump.

An equivalent analyser that is modular and measures several gases simultaneously with such low concentrations has not thus far been in professional use in Finland.

The developed prototype is now technically ready for use, and we are seeking for a productiser and new applications for it.

Provided by VTT Technical Research Centre of Finland

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