SI traceability for mercury vapour measurement in air

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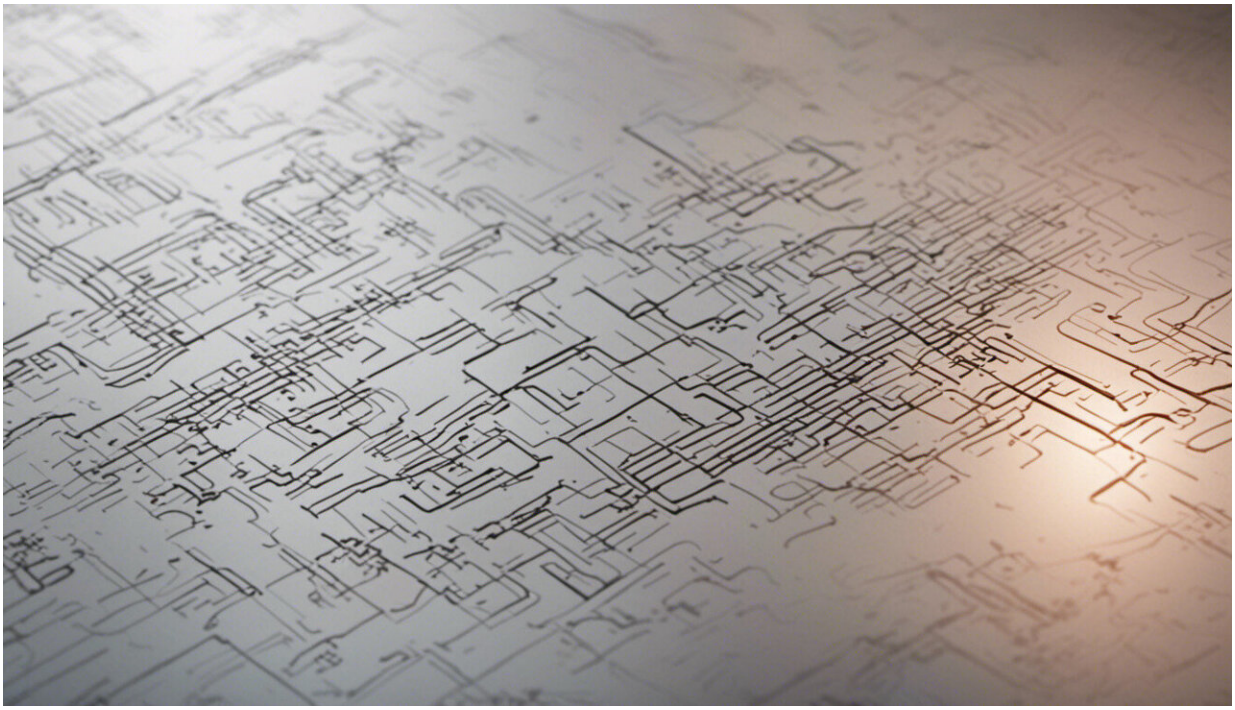

Credit: AI-generated image (disclaimer)

A new experiment, designed by NPL and the Joint Research Centre - Institute for Research Materials and Measurements (JRC-IRMM), has recently been completed and published in *Analytical Chemistry*.

The collaborative experiment, performed as part of the European

Metrology Research Programme (EMRP) ENV02 PartEmission project, is focused on the emerging requirements for measuring pollutants from automotive exhaust emissions. The project involves the expertise of a number of European National Measurement Institutes and has produced fully SI traceable results with uncertainties of 2.2 % (relative) at the 95 % confidence level. It is expected that the values determined in this study will underpin future international agreement on an equation to use to define the mass concentration of mercury vapour at saturation in air.

Read the paper International System of Units Traceable Results of Hg Mass Concentration at Saturation in Air from a Newly Developed Measurement Procedure in Analytical Chemistry.

Ever since the first determinations of the vapour pressure of mercury were made in the middle of the 19th century, there has been debate on the most accurate equation to define the mass concentration of mercury vapour at saturation in air. This has been brought into much sharper focus over the last 10 years with the introduction of more exacting emissions and ambient air regulation for mercury as the detrimental effect of this element on human health and the environment has been increasingly recognised.

Enforcing this legislation has required the accurate and traceable measurement of mercury vapour in air. This has proved challenging since the largest uncertainty contributing to this measurement is related to calibration, which depends directly on the mass concentration of mercury at saturation in air. Indeed, the Clean Air Mercury Rule in the USA was revoked, in part, because of a lack of underpinning SI traceability to support enforcement.

There have been a limited number of experimental attempts to provide SI traceability for mercury vapour mass concentrations in air, most notably an experiment at NPL, in 2008, Establishing SI traceability for

measurement of mercury vapour which attempted to make the link to standards of mass, but which had an uncertainty which was too large to be definitive.

The latest experiment is outlined in the paper International System of Units Traceable Results of Hg Mass Concentration at Saturation in Air from a Newly Developed Measurement Procedure in Analytical Chemistry.

More information: The complete paper is available online: pubs.acs.org/doi/pdf/10.1021/ac5018875

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