

An integrated bubbler-LSC for on-line measurements of gaseous tritium and carbon-14

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Content

Sensitive measurements of tritium or carbon-14 in air require a bubbler to capture and concentrate the activity for off-line liquid scintillation (LSC) measurement. This process is slow and labor intensive. To address these issues, a collaboration between LabLogic Systems Ltd and the National Physical Laboratory (NPL) has been established to develop an automated, on-line radioactive gas monitor. The automation of sample collection, preparation and measurement will reduce labor requirements. On-line measurement will reduce the delay between sampling and measurement analysis.

The proposed instrument is based on LabLogic's on-line radiation-in-water monitor, WILMA. The WILMA instrument has been upgraded to incorporate a bubbler train, furnace and automatic sample transfer which has extended its capability to monitor for HTO, HT, $^{14}\text{CO}_2$, $^{14}\text{CH}_4$ and H-3/C-14 labelled organics in gaseous streams. In addition, the instrument is capable of monitoring for Sr-90, Y-90, Tc-99, Cs-137 and Am-241 in aqueous streams. As such, the instrument is a flexible solution for nuclear sites who may be interested in contaminated ground water, liquid effluent or gaseous discharges.

The specification, design and intended applications of the integrated bubbler-LSC instrument will be presented. This work is partly funded by the EMRP through the MetroDECOM project. The EMRP is jointly funded by the EMRP participating countries within EURAMET and the European Union.

About the Presenter

Steven Bell is a research scientist at the National Physical Laboratory, UK. Steven works within the Radioactivity Group and is responsible for radioactive gas measurement. This includes primary standardization of radioactive gases, calibration of radioactivity-in-air monitors and instrument/method development. Other research interests include gamma spectrometry and spectroscopic X-ray imaging.

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