CONTINUOUS-WAVE TERAHERTZ SPECTROSCOPY APPLIED TO MAINSTREAM CIGARETTE SMOKE ANALYSIS.

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The analysis of the mainstream cigarette smoke is an appropriate situation of detection and quantification of chemical compounds in a hostile environment. The first application of a Continuous-Wave THz spectrometer using photomixing was used to provide detection and quantitative information in this kind of medium. The spectral signatures of hydrogen cyanide, carbon monoxide, formaldehyde and water have been detected and analysed. HCN and CO present a large series of pure rotational J lines in the 600 GHz - 2300 GHz frequency range. The average concentrations of HCN and CO have been evaluated to be 210 ppm and 1.7 % respectively by intensity measurements. These concentration have been validated by the measurement of calibrated gases. The trace gas detection potential of the CW-THz spectrometer has been demonstrated with the estimation of a detection limit of 7 ppm.m for HCN. Finally, pure rotational lines of H_2CO were observed with a very low pressure of cigarette smoke in the cell.