

Correlative gasfilter analyzer for remote sensing of the atmosphere trace gases

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The original optical arrangement of the gas analyzer for remote sensing of trace gases concentrations based upon the correlative gasfilter method is developed. The optical arrangement includes the modulator and reference cell of original design. In the proposed scheme the initial flux is not divided into the reference and measuring constituents. The realization of the gasfilter method is ensured due to the modulator and reference cell design. The modulation mode used allows changes in overall transmittance of the system "reference cell-modulator" thanks to changes in transmittance only in the range of absorption lines of the measured gas. This decision permits the reduction of overall dimensions of the gas analyzer. The output signal is normalized by the average signal throughout the modulation period, which excludes the influence of the non-selective component of radiation. The usage of correlative gasfilter analyzer with proposed optical arrangement allows reduction in requirements to the quality of adjustment of optical elements, which gives a significant advantage when using the gas analyzer as it is much more stable to mechanical effects. At the same time the method allows measurements of gases concentration by absorption spectra in a wide range of wavelengths and ensures maximum sensitivity to the gas measured and minimum sensitivity to other gases with absorption lines in the same spectral range. This makes the correlative gasfilter method most promising among the methods of gas concentration control. The main fields of application of the gas analyzer are ecological monitoring (both remote sensing and local control), technological processes monitoring and gases escape control at industry.