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QUANTITATIVE DETERMINATIONS OF CARBON OXIDES IN ATMOSPHERE BY ABSORPTION SPECTRA

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Abstract

The carbon oxides - CO and CO₂ normally exist in the atmosphere or they are generated by different chemical reactions like burning or with the participation of organic compounds. The ratio of concentration of these gases determines the stage of food fermentation. To control different processes it is necessary to provide quantitative determinations of concentration of CO and CO₂. Today, for determination of concentrations, chemical methods are used, but they require a lot of time and special equipment. These shortcomings are not characteristic for optical methods – the analyses of absorption spectra. As it was proved by experimental measurements, the CO₂ and CO molecules don't have absorption bands in the visible and near ultraviolet range of spectrum. It was recorded the transmission spectrum of atmosphere (p = 1 atm, T = 298K) in the range of vibration bands of studied atoms. The vibration-rotation bands of H₂O, CH, CO₂ and CO molecules have been identified. Dependence between optical density and path length crossed by radiation in CO and CO₂ columns was analyzed. These results allow direct measurement of the concentration of these gases in the atmosphere.

Key words: absorption band, carbon, concentration, vibration-rotation

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