

conductivity due to their own charge carriers. The temperature dependence of the conductivity of a semiconductor determines by the formula.

$$\sigma_i = \sigma_0 e^{\frac{E_g}{2kT}}, \quad (1)$$

where σ_0 expresses the electrical conductivity of the semiconductor as $T \rightarrow \infty$. From the experimental curves of the temperature dependence of the intrinsic conductivity of the semiconductor for germanium and silicon, the band gap was calculated. As a result, $E_g = 0.79$ eV for germanium and $E_g = 1.10$ eV for silicon. The conductivity values for germanium and silicon at room temperature are $\sigma_0 = 2.13 \Omega^{-1} \cdot m^{-1}$ and $= 3.30 \cdot 10^{-4} \Omega^{-1} \cdot m^{-1}$ correspondingly, they were determined from the experimental curves and the formula (1). Due to the relatively high intrinsic conductivity at room temperature in germanium, the number of free carriers is large; therefore, when operating germanium-based detectors, should be cooled to a temperature of about 77 °K.

In the Republic of Belarus radiation and environmental monitoring is carried out around the clock in places near the nuclear power plants surrounding the Republic of Belarus, monitoring is also being carried out in the area of the Belarusian nuclear power plant.

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METHODS FOR NO_x MEASUREMENT IN EXHAUST FROM AIRCRAFT ENGINES AT CIVIL AIRPORTS

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The operation of mobile and stationary emission sources at airports causes ambient air pollution. The fuel combustion leads to the emission of nitrogen oxides (NO_x), carbon monoxide (CO), soot and particulate matter. The risk to the population's health from nitrogen dioxide is due to both the direct action of NO_x and the products of its reactions – O₃ and PM.

Keywords: aircraft engine, ambient air pollution, nitrogen oxides, air quality, monitoring, exhaust.

More than 99,9 % of the molecules comprising the Earth's atmosphere are nitrogen (N₂), oxygen (O₂), or one of the rare gases. Inorganic compounds in atmosphere consist of acids, bases, salts, and oxides of metals or nonmetals, together with the elements that comprise them and the ions and radicals derived from them [1]. Nitrogen oxides (NO_x) are formed as a result of atmospheric oxygen interaction with nitrogen at high temperatures, which is prerequisite for aircraft operation at maximum thrust [2].

Ground-level emissions associated with the airport have the biggest impact on local air quality whereas elevated aircraft emissions have less impact because they take place at increasing height. However, aircraft produce approximately 54 % of ground level emissions, whereas airport related traffic is estimated to emit a further 28 %. Analysis of inventory emission results at major European highlighted, that aircraft are the dominant source of air pollution in most cases under consideration [3, 4].

In order to assess the emissions from aircraft engines, the pollutant emission index (EI) was introduced as the basic criterion. In accordance with the aviation regulations of the Ukraine and the corresponding ICAO standards [5], the emission values of selected pollutants are determined on engine test beds under atmospheric conditions and are summarized in an ICAO database [6]. However, the test bed conditions do not reflect the operating conditions in the “real world” [5].

The ICAO Airport Air Quality Control Guide offers active and passive methods for monitoring instrumentation. The experience of leading European airports indicates the prevalence of spectroscopic methods FTIR, DOAS, and the chemiluminescence method for detecting and determining the emission components of aircraft

engines. Nevertheless, analysis of instrumental studies at Zurich, Vienna and Budapest airports indicates the inapplicability of using DOAS and FTIR methods to determine the concentration in jet streams since the principle of measuring these spectroscopic systems is aimed at determining only averaged concentrations [6].

The chemiluminescence method for the determination of the concentration of nitrogen oxides was analyzed at the laboratory of the University of Wuppertal (Germany). The system for monitoring nitrogen oxides includes:

- Air circulation pumps in the system to supply sufficient air into the tubes.
- Flow-controlling system consists of the flow meter for every device separately to provide the appropriate gas flow (about 1,5 l/m³ for every gas analyzer), the flow-controller to adjust the entire gas flow at the system, and flow meter.
- The two gas analyzers ECO physics CCD 770 Al ppt to analyze NO/NO_x concentration using the chemiluminescence technique (the reaction of NO with ozone, which emits fluorescence).



- The gas phase titration by means of Asyco GPT/100 to calibrate the NO and NO_x system.

The combination of systems for detecting NO / NO₂ / NO_x and CO concentrations in the gas flow from an aircraft engine allows determining the emission indices (2) under real operating conditions at the airport:

$$EI(X)=EI(CO_2)*M(X)/M(CO_2) * (Q(X))/(Q(CO_2)), \quad (2)$$

where, M (X) is the molecular weight of the pollutant (X); Q (X) - detected concentration of the pollutant ; EI (CO₂) = 3200 g/kg. In terms of transport pollution, in particular the air pollution from the aircraft engines, the emission indices are the fundamental tool applied to make up the inventories and calculate taxes and fares for air pollution. Moreover, the real EI is a representative value to get the real pattern of air pollution contributors at the airport, because the real EI differs from the indices obtained from the engine bench tests. In addition, the relative contribution is important to develop the strategy for the air pollution decrease [7].

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POTENCIALITIES OF REAGENT PURIFICATION OF POLLUTED INDUSTRIAL WASTEWATERS

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Industrial wastewater treatment systems should ensure the effluent safety incoming into the sewer systems as municipal wastewater treatment plants and urban water body ecosystems are at risk of pollution.

Keywords: wastewaters, heavy metal pollution, reagent purification.