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Technical Paper

Investigation of Method for measuring dinitrogen monoxide in exhaust gas from gasoline/diesel engine

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1. Method for measuring dinitrogen monoxide in automotive engine exhaust gas

1) Introduction

Substantially no standard has been established for the methods for measuring dinitrogen monoxide (which is the same as nitrous oxide, hereinafter referred to as N_2O) emitted from automobiles.

Meanwhile, since N_2O in automotive exhaust gas is measured in many places, it is important to study problems for the measurement methods to ensure reliability of the measured values.

The methods for measuring N_2O include Infrared Spectroscopy (IR), Gas-chromatography (GC), the mass spectrum method and the volumetric method. In the GC method, Thermal Conductivity Detector (TCD), Ultrasonic Phase Shift Detector (US-PSD), Electron Capture Detector (ECD) and Non Dispersive Infra Red (NDIR) and others are used as a detector.

Among these methods, a gas chromatography with electron capture detector (hereinafter referred to as the GC-ECD method) is widely used as the method for measuring automotive exhaust gas, since the method does not require the operation for concentrating a specimen at a high sensitivity. Accordingly, we have summarized the result of the study on the analysis method, the problems, and the countermeasures of GC-ECD.

This document summarizes the problems (notes) of the method for measuring dinitrogen monoxide based on “Method for measuring nitrous oxide (N_2O) in exhaust gas from gasoline/diesel engine” which was created by Subcommittee for Non-regulated Substance, Committee for Exhaust Gas and Fuel Economy, Japan Automobile Manufacturers Association, Inc., based on the findings at Japan Automobile Research Institute. Note that the devices and analysis conditions described herein are merely an example, and the conditions that are appropriate for the individual devices need be set.

2) Purpose

To clarify the problems (notes) of and to standardize the method for measuring N_2O in exhaust gas from gasoline/diesel engines using the GC-ECD method.

3) Component to be studied

The component to be studied is the following 1 component.

- Dinitrogen monoxide (= nitrous oxide, N_2O)

2. Problems in the result of study on the method for measuring dinitrogen monoxide

The following problems have been identified in the method for measuring N_2O from automotive exhaust gas. At measurement, it is necessary to understand the impact of such problems and make countermeasures.

- Problem of transmission of gas to be measured through container

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