



Nippon Instruments Corporation  
14-8 Akaoji-cho, Takatsuki-shi  
Osaka 569-1146  
Japan  
TEL: +81 7 26 945 195  
FAX: +81 7 26 940 663

# Press Release

## Nippon Instruments Corporation Publishes Method for Measurement of Total Mercury in Shale Oil Using Direct Mercury Analysis

**August 17, 2017 – Osaka, Japan.** [Nippon Instruments Corporation](#) (NIC) has published a new application report describing the measurement of mercury (Hg) in shale oil by thermal decomposition using atomic absorption spectroscopy. The method detailed in the report complies with [US EPA Method 7473](#), *Mercury in Solids and Solutions by Thermal Decomposition, Amalgamation, and Atomic Absorption Spectrophotometry* and [ASTM D - 7623-10](#), *Standard Test Method for Total Mercury in Crude Oil Using Combustion-Gold Amalgamation and Cold Vapor Atomic Absorption Method*.

NIC Application Note MA-3A-EG-103 includes complete information describing sample preparation, calibration and measurement, and highlights the performance of the [NIC MA-3000](#) direct thermal decomposition mercury analyzer.

Oil shale is an organic-rich fine-grained sedimentary rock containing kerogen, a solid mixture of organic chemical compounds from which liquid hydrocarbons known as shale are produced. Shale oil can be used as a substitute for conventional crude oil. Extracting shale oil from oil shale, however, is costlier and has greater environmental impact than production of conventional crude oil.

Research has shown that many shale deposits are high in mercury and that significant quantities of mercury can be released during oil shale processing. Mercury also presents numerous issues for downstream refineries beyond the environmental impact, such as detriment to the refining process through amalgamation with other metals, poisoning of catalysts, and liquid metal embrittlement.

Mercury is also dangerous to both natural ecosystems and humans as it is highly toxic, especially in its ability to damage the central nervous system. To prevent both mercury poisoning and damage to the refining infrastructure, it is therefore necessary to accurately quantify total mercury in shale oil.



**NIC MA-3000 Direct Thermal Decomposition Mercury Analyzer**





For the analysis described in the report, calibration was done using certified aqueous ionic-mercury standard solution diluted to the required concentration.

Measurement was performed by the MA-3000 analyzer, a dedicated direct mercury analyzer that selectively measures total mercury by thermal decomposition, gold amalgamation and cold vapor atomic absorption spectroscopy. The MA-3000 analyzer is designed to provide quick results without an elaborate, time-consuming sample preparation process.

The results show that the instrument is able to reproduce good standard addition recovery of shale oil and analyzes the samples with accuracy and precision, demonstrating the ability of the MA-3000 analyzer to meet increasing laboratory demand for simple, fast and precise mercury measurements.

A copy of this report may be requested at [shar-nic@rigaku.co.jp](mailto:shar-nic@rigaku.co.jp)

### **About Nippon Instruments Corporation**

Nippon Instruments produces a broad line of Hg monitors suitable for surveying for vapor-phase elemental mercury in air, and elemental and mercury compounds including methylmercury, in gases, liquids and solids. Materials analyzed include fuels – coal, lignite, crude oil, natural gas; liquids such as waste, drinking and river water; incinerator stack gases; animal products; human tissue and blood and solid waste streams.

For further information, contact:

International Sales Division

TEL: +81- 726 94 5195

[shar-nic@rigaku.co.jp](mailto:shar-nic@rigaku.co.jp)

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