Office of Technology Management

Abatement Of VOCs In Exhaust Gases By Wet Pulse Corona Discharge

Technology Reference

CV76

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Field

Air pollution control

Key Words

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VOC removal

Pulse corona

Gaseous wastestreams

Low temperature plasma

Waste water treatment

License Status

Seeking licensing partner

Patent Status

Patent application submitted

Overview

There are numerous methods for the removal of VOCs from waste gases with the help of electrical discharges, and particularly with the help of the pulsed corona discharge. Alternative technologies are either only effective at low VOC concentrations or they attempt to destroy the contaminants thus consuming large amounts of energy.

Technical Summary

A novel VOC removal system consisting of a combined pulse corona discharge and scrubber are used to remove VOCs from a waste gas stream. Thus the term "wet" corona discharge.

Volatile Organic Compounds (VOCs) in a waste gas stream are partially oxidized (i.e., not destroyed) by corona discharge to increase their solubility in water and then scrubbed into an aqueous waste stream. The aqueous waste stream is then treated in the facility's wastewater treatment plant to destroy the partially oxidized VOCs.

This process is economically applicable to both relatively high and dilute VOC concentrations. It uses only a small fraction of the energy required to destroy the VOCs and has a minimal additional loading on the wastewater treatment plants of most industrial facilities.

Water from the facility's wastewater treatment plant is satisfactory for use in the scrubber.

Benefits

- Economics will cost less than competition

Areas of Application

- VOC removal from gas waste streams in a facility that also has access to an industrial wastewater treatment plant.
- Removal of VOCs from exhaust gases to meet air pollution control regulations.

Publication

- Fridman, A., Sobacchi, M., Saveliev, A., Gutsol, A., Kennedy, L.A. Application of Non-Thermal Atmospheric Pressure Plasma for Treating Volatile Organic Compound Emissions. –199th Meeting of the Electrochemical Society, Washington, March 25 –29, 2001. Meeting Abstracts, Vol. 2001-1, Abstract No. 196.
- 2. Sobacchi M. G., Saveliev A. V., Fridman A. A., Gutsol A., Kennedy L. A. Experimental Assessment of Non-Thermal Plasma Techniques for Removal of Paper Industry VOC Emissions. –15th International Symposium on Plasma Chemistry, Orleans, July 9 –13, 2001. Symposium Proceedings, Vol. VII: Poster Contributions, pp. 3135 - 3140.

Stage of Development

- Laboratory Scale Pilot Scale Demonstration planned for 2003