Combined Ultraviolet/Ozone Treatment to Simultaneously Control Nitrosamine/Nitramine and Amine Emissions from Amine-Based Carbon Capture

Description:

The concentrations of contaminants in the washwater provide one of the best estimates of contaminant emissions from carbon capture facilities to downwind communities. These systems are scrubbers designed to remove contaminants from the flue gas. However, contaminants will accumulate in the washwater, reducing the driving force for mass transfer from the flue gas to the washwater. At high enough contaminant concentrations in the washwater, these contaminants might be stripped back into the exhaust gas. Additionally, for any contaminants that form in the washwater, the mass transfer driving force will work in the opposite direction, such that the washwater would serve as a source of contaminants to the exhaust gas.

There are currently no standard flue gas treatments for nitrosamines and nitramines, and those for amines tend to rely on pH adjustment of washwater or higher washwater replacement rates.

Bill Mitch, an Associate Professor of Environmental Engineering at Yale University, has found a novel washwater treatment technique that has the potential to significantly reduce cost of controlling emissions from amine based carbon capture facilities.

Contaminants that are of particular concern include:
- 1. Nitrosamines
- 2. Nitramines
- 3. Amines
- 4. Aldehydes
- 5. Nitrite

Mitch’s method has the ability to destroy all five of these contaminants.

Field of Application: Carbon Sequestration

Advantages: Reduced cost, better quality treatment of washwater, decreased pollution

Stage of Development: Proof of concept

Publications:

Unpublished patent application and research findings available under confidentiality

PI: William Mitch

Licensing Contact: Richard Andersson
richard.andersson@yale.edu