

A Proposed Method on Determination of Destruction and Removal Efficiency (DRE) for Perfluorocompounds (PFCs) by Gas Scrubbers

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Recently, the information technology (IT) industries have attempted to lower the emissions of perfluorocompounds (PFCs), greenhouse gases under the global regulation on the climate change. Total amount of PFC emission is calculated from the flow rate and the partial pressures of PFCs. For the precise measurement of PFC emission amount, the mass flow controlled helium gas is continuously added into a scrubber, as an emission control technology, of which destruction and removal efficiency (DRE) is being measured. The partial pressures of PFCs and helium can be accurately measured using a mass spectrometer in each sample extracted from inlet and outlet of the scrubber system. The flow rates are calculated from the partial pressures of helium and also, PFC DRE of the scrubber is calculated from the partial pressure of PFC and the flow rate. Using this method, the relative expanded uncertainties of the flow rate and the partial pressures of PFCs are $\pm 2\%$ ($k=2$) in case the concentrations of NF₃ and SF₆ are as low as 100 $\mu\text{mol/mol}$.