國立中央大學 National Central University

環境工程研究所

Graduate Institute of Environmental Engineering

Air Pollution Control Laboratory (空氣污染控制實驗室)

Prof. Moo Been Chang

- Ph.D in Environmental Engineering, University of Illinois at Urbana-Champaign (UIUC)

Instruments

DFS HRGC/HRMS

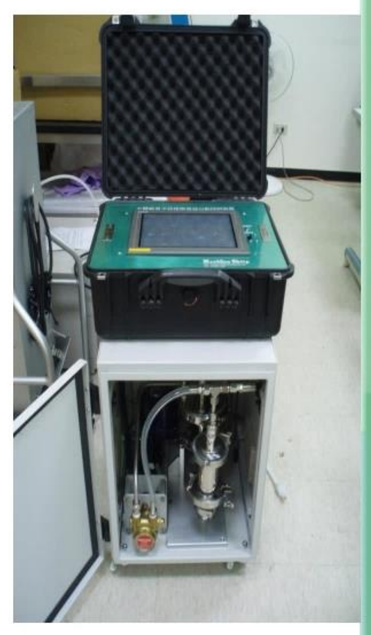
FT-IR

Oscilloscope

DC pulse generator

Stack gas sampler

Automated PCDD/F deposition sampler



Automated PCDD/F water sampler

Major Research Topics:

Applications of plasma and catalysis for pollution control

- ***Development of innovative control technologies for reducing NO_x emission***

Injecting appropriate amount of ozone into the flue gas favors NO_x oxidation to form N_2O_5. Via applying suitable catalyst, the reaction rate can be greatly enhanced and the residual ozone can be effectively decomposed.

- ***Applying plasma catalysis for dry reforming of methane (DRM)***

DRM can be applied to convert CH_4 and CO_2 to syngas (CO and H_2) to effectively reduce greenhouse into gases emission because CH_4 and CO_2 are two most important greenhouse gases. Plasma catalysis as a promising technology for DRM can reduce coke formation, increase product selectivity, improve catalyst stability and enhance energy efficiency.

- ***Hydrogen generation from ammonia decomposition.***

Decomposition of ammonia via plasma catalysis can be considered as potential source for generating hydrogen which is regarded as green energy since no carbon-based byproducts are generated. The process has a good potential to reduce CO_2 emission from fossil-fuel combustion.

- ***Applying plasma and catalysis for the abatement of PFC emissions***

Reduction of perfluorinated compounds (PFCs) emission is evaluated via three systems, including catalytic hydrolysis, non-thermal plasma, and plasma catalysis, respectively, for developing effective control technology to alleviate global warming effect.

Measurement and control of POP emissions

- ***Simultaneous analysis of multiple halogenated pollutants***

To simplify the pretreatment steps and save the time required simultaneous , clean-up procedures for subsequent analysis of PCDD/Fs, dl-PCBs, PCNs have been developed. This process greatly reduces the amount of solvent needed for the pretreatment.

- ***Reducing PCDD/Fs concentrations in MWI fly ash via pyrolysis process***

Catalytic pyrolysis process is developed to effectively enhance the destruction efficiencies of PCDD/Fs in MWI fly ash. The results obtained indicate that Ni/C is a suitable catalyst for PCDD/Fs destruction due to its low cost, high activity and reusability via magnetic field.

- ***Characteristics of PAHs/PM emitted from various industries***

Emission characteristics of PAHs and PM from various sources including MWIs, coal-fired power plants and cement plants are evaluated and the removal efficiencies of air pollution control devices (APCDs) adopted are systematically assessed.

- ***Characterization of mercury emissions from industries***

Major sources of mercury emission include coal-fired power plants, MWIs and cement plants. Emission characteristics of mercury from these sources are evaluated using USEPA method 30B, OHM, and CEMs, respectively.