

Developing the Techniques for Air Pollution Control in Chiang Mai Areas and the Demonstrated Application

Agriculture and tourist trade are the two pillar industries for several one-belt-one road countries, contributing more than 30% GDP of their total income. During spring and winter seasons, serious air pollution originated from biomass burning frequently occurs in east-south Asia countries such as Thailand, Vietnam and India, where a large amount of particles and volatile organic compounds were emitted to open space and caused haze problem. The concentration of PM_{2.5}, ranged from 100~300 $\mu\text{g}/\text{m}^3$, is about 10-30 times of the WHO standard of safe level. The air pollution problems both threaten people's lives and influence tourist trade in Thailand. Therefore, it is urgent to take measures to solve the problem by cooperation through countries with the support from ANSO international platform. Research team of the applicant focus on photocatalytic nanomaterials and technologies for air pollution control for more than 10 years and have accumulated abundant experience and knowledge. They undertake the national projects from MOST and NSFC and have ability to assemble equipment and construct large scale air-cleaning system. Based on our previous accumulations, we were invited by Chiang Mai Government to visit Chiang Mai in 2019 and signed MOU about cooperation to solve air-pollution problems.

This project will concentrate on solving air-pollution problem in Chiang Mai and other east-south Asia countries through the cooperation among SICCAS, Chiang Mai University and Saigon University. The target is to decrease both volatile organic compounds and particulates. Photocatalytic technology will be applied to decompose various typical VOCs such as ethylene, xylene and acetone. Different photocatalysts will be designed and synthesized and their photocatalytic properties will be investigated. The materials with the good

performance will be adopted to assemble photocatalytic modules. For particulates produced from biomass burning, two kinds of technique, water mist spraying and plasma electrostatic precipitation will be taken. Both modules will be applied to remove hydrophilic or hydrophobic particles and reduce the concentration of $PM_{2.5}$ and PM_{10} . Finally, distributed large-scale air purification devices will be constructed through the integration of multi-function modules. Active City Air Purification System will be designed according to various regional climate characteristics. The joint research project will meet the actual request of urban space air purification in Chiang Mai and realize the demonstrated application of advanced haze control technology and system in China. The implementation of project will not only promote our air pollution control technology to solve the problem in Thailand, but also will increase the influence of ANSO organization, accelerating the harmonious development between economics and environment.