ANALYSIS OF BLACK PARTICULATE MATTER COMPOSITION IN THE AIR OF KEELUNG AND DISCUSSION OF ITS SOURCES.

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Research Motivation

We have always been curious about the black sticky substances that linger on buildings in Keelung's air. The black material found in ventilation fans can be made up of particulate matter, including coal, oxidized metallic materials, and soot from transportation, industry and domestic combustion processes.

Research Objectives

(I) Analyze the main substances affecting air quality in the Keelung area.
(II) Investigate the influence of extended observation time on air quality parameters, considering variations in wind direction.
(III) Determine the relationship between dry deposition of pollutants and terrain features, specifically focusing on areas closer to mountainous regions
(IV) Analyze and detect the components of black substances through experimental analysis.

Literature Review

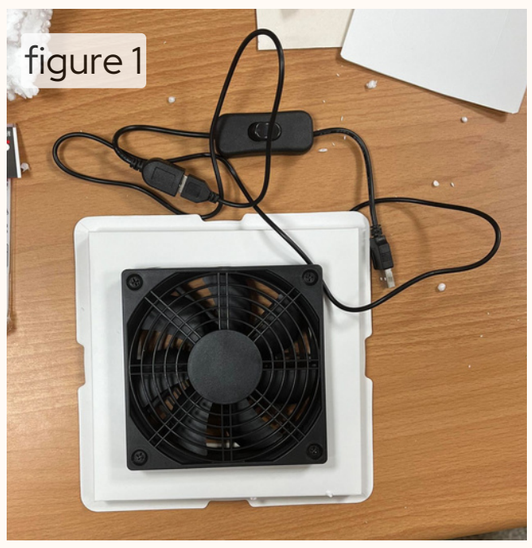
Pollutants in Taiwan's air include PM2.5, PM10, ozone (O3), sulfur dioxide (SO2), nitrogen dioxide (NO2), and carbon monoxide (CO). These pollutants primarily stem from industrial, traffic, and domestic sources. (Taiwan Healthy Air Action Alliance, 2016)

http://www.airclean.tw/index.php/2016-05-27-14-06-07/2016-06-09-03-52-44/120-2016-08-30-13-55-21

Black substances, primarily from combustion like vehicle emissions, contain carbon components and include black carbon, a key component of airborne particulate matter. These substances, difficult to chemically remove, originate from traffic, fuel combustion, and industrial processes, impacting climate and health by reducing visibility, accelerating ice melt, and posing health risks. Gas-phase chromatography is used for air pollutant measurement, crucial due to the significant environmental and health impacts of particulate matter, affecting visibility, solar radiation, and climate.(Gao Yuyun, 2014)

https://ndltd.ncl.edu.tw/cgi-bin/gs32/gsweb.cgi?o=dnclcdr&s=id=%22102MIT00515005%22.&searchmode=basic

Experiment photos



Experimental equipment: exhaust fan, filter paper, cake box, cardboard

figure 1
Fixed exhaust fan

figure 2
Use cardboard to raise the cake box to allow ventilation

figure 3
Completed picture

Experimental data

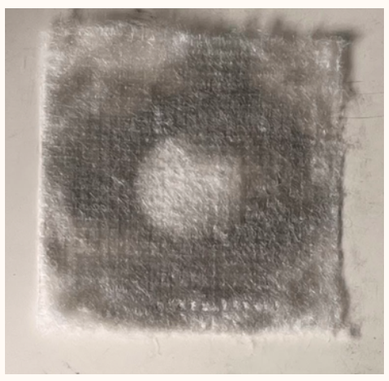


figure.4 The change in the filter paper after measurement (increased by 0.1 grams)2024 Jan 6th~Jan 7th

(1) Indoor dry deposition material is significantly less.
(2) Some dry deposition materials were collected towards the west or southwest, leading to an increase in the weight of the equipment.

completion

(1)We must extend the observation time, but it may involve experiencing different wind directions.
(2) As indicated in Figure 1, observation locations labeled as Number 1 and Number 2 are closer to mountainous areas. Therefore, it is inferred that the amount of dry deposition is also related to the terrain.