THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

大氣酸性超細粒子擴散採樣器
Diffusion Sampler for Acidic Ultrafine Particles in the Atmosphere

檢測及量度大氣酸性超細粒子的嶄新方法及裝置
Novel technique and device for detecting and measuring atmospheric acidic ultrafine particles

在空氣中，超過90%的懸浮粒子為超細粒子（即直徑0.1微米或以下的粒子）。研究顯示，懸浮粒子的濃度與疾病的發生率及死亡率有著密切的相關，特別是呼吸系統及心血管的疾病。由於目前缺乏測量超細粒子的技術，有關方面的研究仍處於初步階段。

理大研究團隊依據擴散沉積原理研發出嶄新的低流量擴散採樣器，以鐵納米薄膜探測片識別通過採樣器的空氣中的酸性超細粒子，從而測量粒子的濃度數值和粒徑分佈。

特色與優點

- 操作簡便，安全可靠
- 適用於户內和户外測量
- 提供客觀及可量化的數據，可作大氣中酸性超細粒子的濃度指標

應　用

- 空氣污染控制：評估各項改善空氣質素的措施
- 流行病學研究：量化空氣污染對公眾健康的影響

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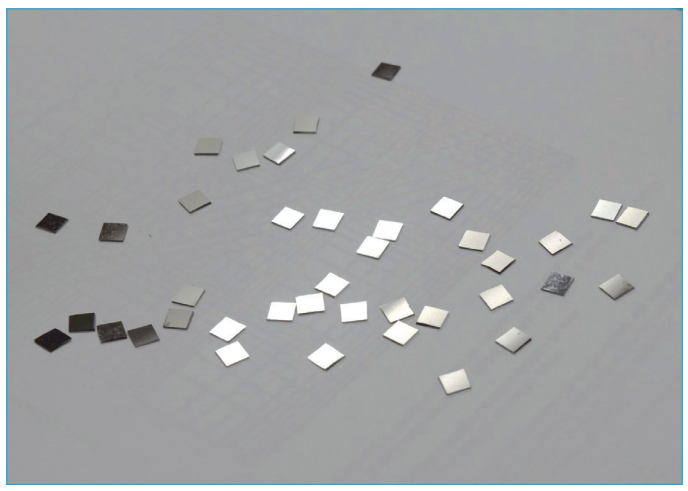
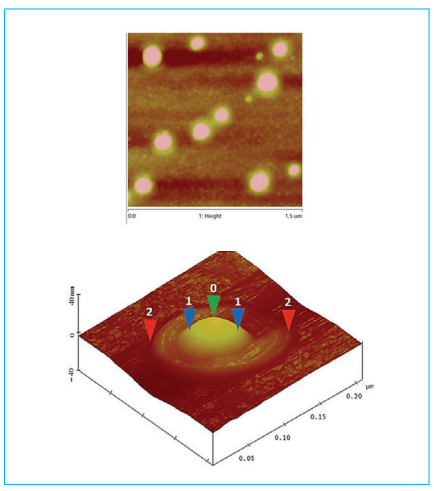
Diffusion sampler for acidic ultrafine particles in the atmosphere



鐵納米薄膜探測片
Iron nano-film detector



原子力顯微鏡下的酸性超細粒子
Image of acidic ultrafine particles under atomic force microscope (AFM)

More than 90% of atmospheric particulate matter is made up of ultrafine particles (i.e. particles of 0.1 micrometer or smaller in diameter). Research findings indicate that the concentration of ultrafine particles in the air is closely related to the incidence and mortality rate of diseases, especially those of the respiratory and cardiovascular systems. However, owing to the lack of effective techniques for measuring acidic ultrafine particles, research in this area remains at an early stage.

The PolyU research team has developed a novel low-flow diffusion sampler based on diffusion deposition. Using iron nano-film detectors, the device can identify acidic ultrafine particles in the air that flows through it, thereby determining the concentration and size distribution of particles.

Special Features and Advantages

- Easy to operate, safe and reliable
- Suitable for both indoor and outdoor measurement
- Provides objective and quantifiable data for assessing the measurement of acidic ultrafine particles in the atmosphere

Applications

- Air pollution control: assessment of various measures for improving air quality
- Epidemiological study: quantification of the impact of air pollution on public health

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