

## In-situ system for investigating the toxicity of PM<sub>2.5</sub> using a versatile aerosol enrichment system

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The toxicity of atmospheric particles directly associates to health effects, but its online monitoring has not yet been implemented due to low toxic components and high measurement detection limit. We extended a versatile aerosol concentration enrichment system (VACES) for toxicity measurement and first used VACES to provide a comparison of toxicity between aerosols and concentrated aerosols in atmosphere. Through optimizing the technical parameters, the total intake aerosol concentration in the VACES was elevated by a factor of about 10. The toxicity of ambient samples increased by 1.5 to 8.4 times in VACES, especially those with toxicity below the detection limit, which were detected significantly after enrichment. Whereas, the increase rate in toxicity was less than the increase in the number or mass concentration of particles in VACES, which was probably driven by the fluctuations of the bacteria themselves or by the combined effect of toxic components on toxicity. The results also imply that VACES will provide technical support for the measurement of online atmospheric particulate toxicity, which is currently performed at high-concentration environment, long sampling duration, and offline.

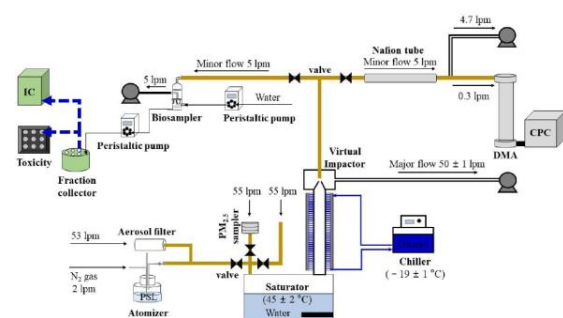


Fig.1 Set-up for VACES characterization, toxic and chemical analysis of PM<sub>2.5</sub>