

Development of a new QCM-based instrument for PM_{2.5} mass concentration measurement with continuous dry phase particle removal

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Particulate matter (PM) is one of the most critical air pollutants. A wide range of instrument based on bulky structures and miniature structures have been developed to measure the PM_{2.5} mass concentration. Of these, QCM-based aerosol sensors are considered an appropriate candidate for the measurement of mass concentration of PM. These instruments possess sufficient sensitivity for environment monitoring; however, they remain some drawbacks, especially non-uniform deposited mass distribution which might cause non-linear behavior of QCM crystal. Thus, we developed a novel instrument for PM_{2.5} measurements, namely qEPC, by integrating a QCM crystal with an electrostatic particle concentrator (EPC) for particle sampling (Ngo et al., 2019). The scheme for qEPC performance characterization is as in Fig. 1. Calibration data shows that the mass sensitivity and mass concentration sensitivity of the qEPC instrument are 57 Hz/μg and 0.067 (Hz/min)/(μg/m³), respectively. We are currently working on dry phase particle removal to continuously measure the PM_{2.5} without changing the crystal.

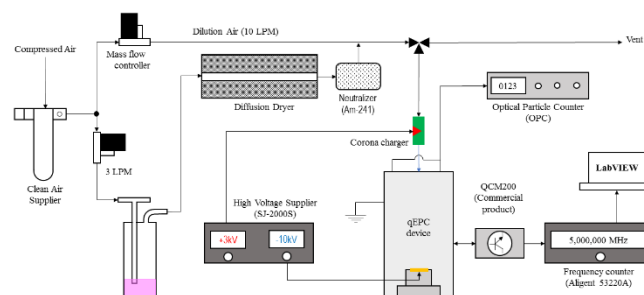


Figure 1: Experimental setup for evaluating the performances of the qEPC device

감사의 글

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참고문헌

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