

Measuring Urban Aerosol Volatility Fractions with a Catalytic Stripper at an ACTRIS Aerosol Observatory: Characterization and Implementation

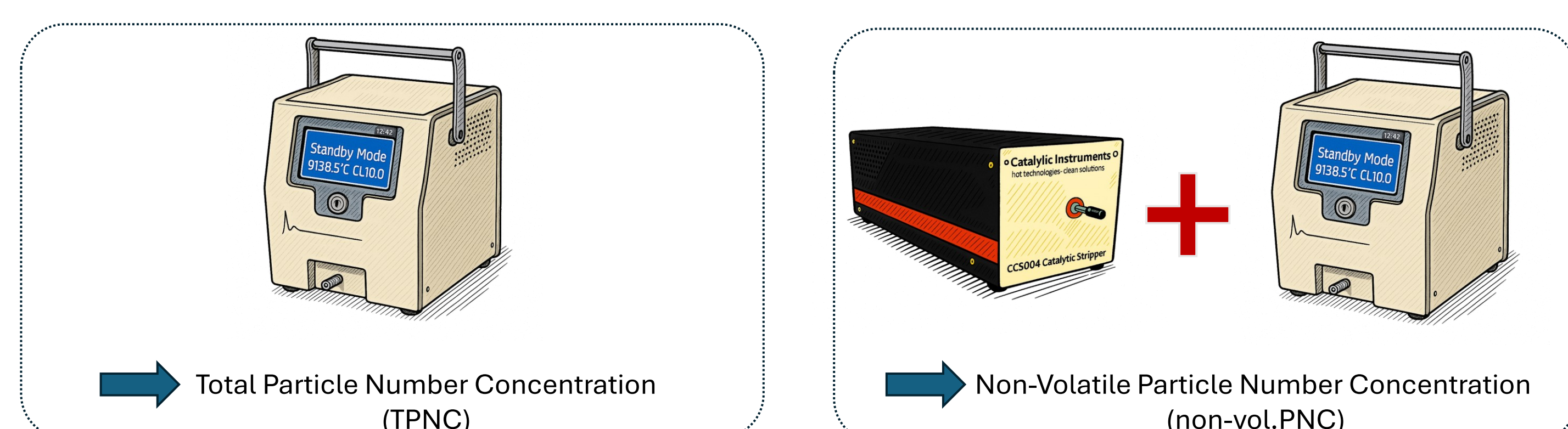
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1. Motivation

Condensation Particle Counters (CPC) are well-established instruments for detecting nanoparticles and measuring aerosol number concentration. They are an essential part of the instrumentation for environmental monitoring.

Catalytic Strippers (CS) are a well-established method for removing the volatile fraction of an aerosol enabling the measurement of the concentration of non-volatile particles (Giechaskiel et al., 2020; Swanson and Kittelson, 2010).



- ✓ Parallel measurements of Total Particle Number Concentration and the non-volatile Particle Number Concentration enables the determination of the Non-Volatile Number Fraction (NVNF):

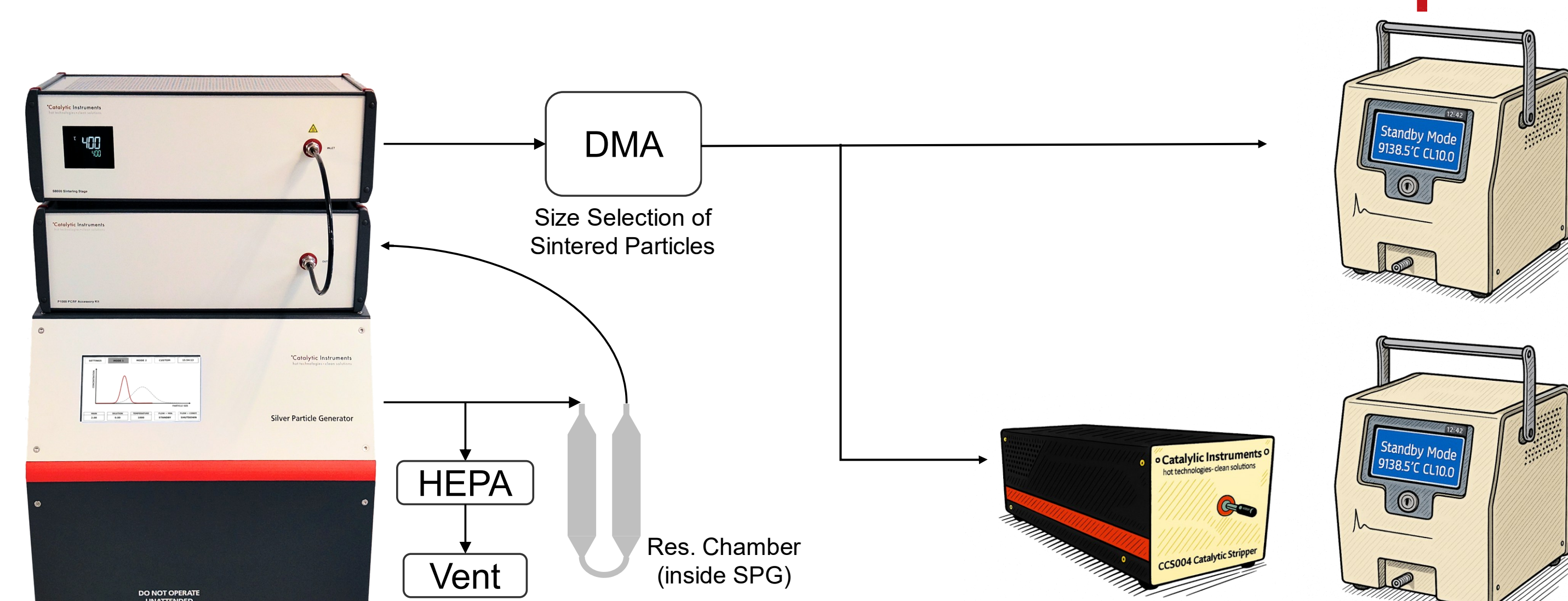
$$NVNF = \frac{\text{non-vol.PNC}}{TPNC}$$

- ✓ NVNF provides additional information about the aerosol:

- Aerosol Composition
- Source Apportionment
- Transport/Aging of Aerosol Particles
- Hygroscopicity

(e.g. Weinzierl et al. (2006); Wehner et al. (2005, 2009); Ehn et al. (2007))

2. Validation and Characterization Setup

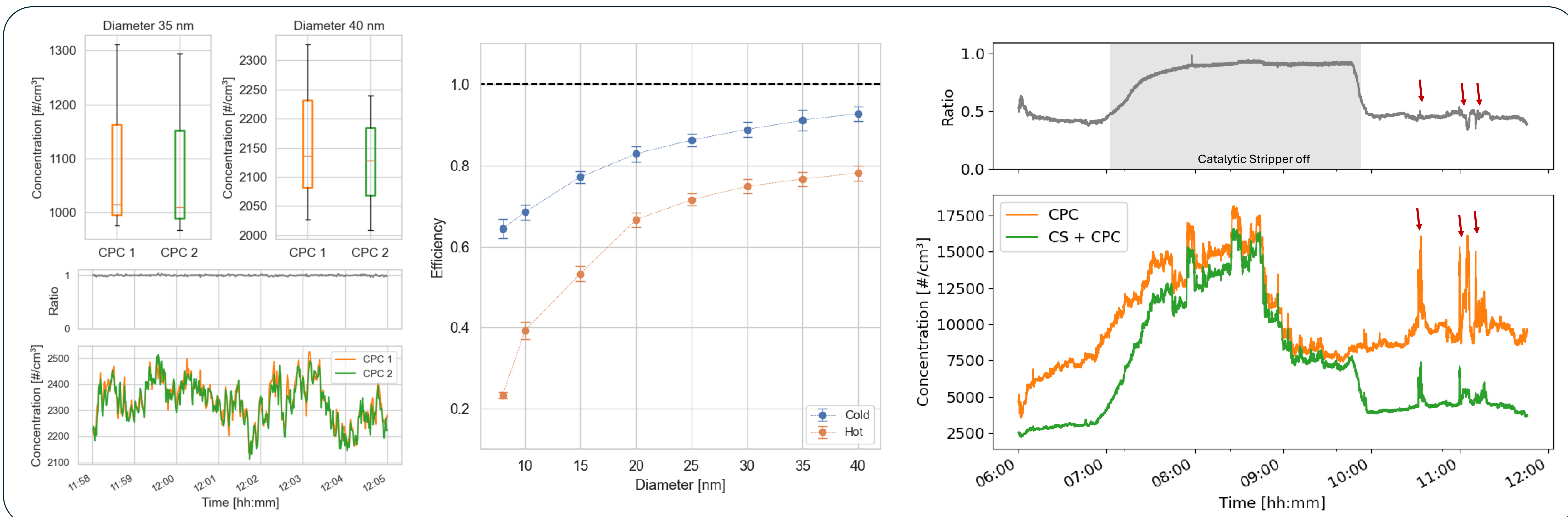


Silver particles are generated with the Silver Particle Generator (SPG) and treated by the Sintering Stage S8000 to obtain thermally stable silver spheres in the size range between 2nm and 100nm. First, the CPCs are validated without CS to ensure comparable measurements. Subsequently, the CS is connected to the second CPC, and the particle penetration efficiency of the CS is characterized.

3. University of Vienna Aerosol Observatory



4. Results



5. Conclusions

- ✓ Successful implementation of a Catalytic Stripper in the University of Vienna Aerosol Observatory.
- ✓ The functionality of the Catalytic Stripper is clearly visible.

- ✓ Measurements with an active catalytic stripper provide additional information by determining the non-volatile number fraction.

□ To be done: Size-dependent particle loss correction

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