Insights from over Two Years of DMSO Use as a Working Fluid in Condensation Particle Counters

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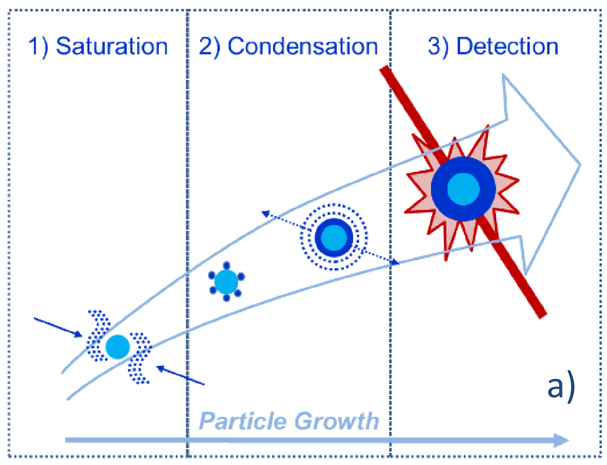
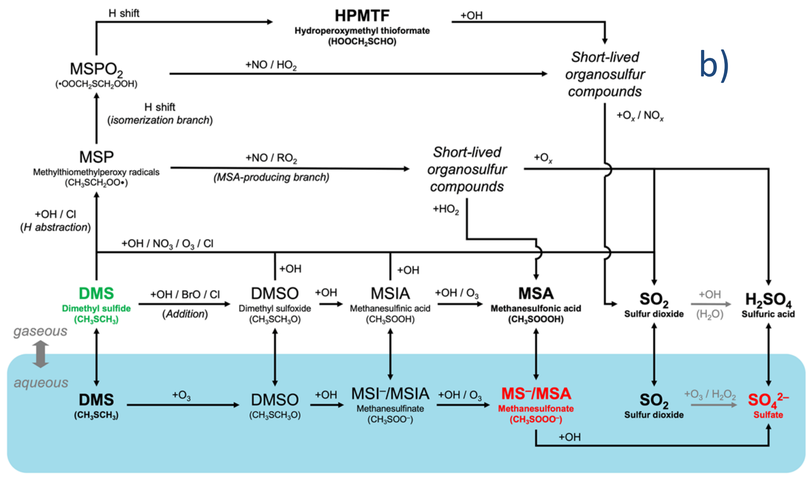
Operating Principle of Condensation Particle Counters



- For the total number concentration of aerosol particles down to ≤ 10 nm
- Rely on working fluids to operate
- Most commonly used working fluids are alcohols such as Butanol

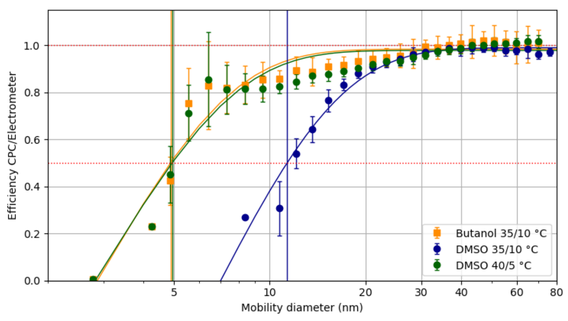
What is DMSO?

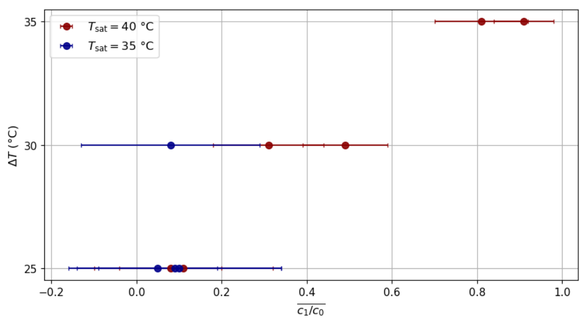
- **D**i – **M**ethyl – **S**ulf – **O**xide
- Found in the atmosphere and in living organisms mostly as an intermediate stage

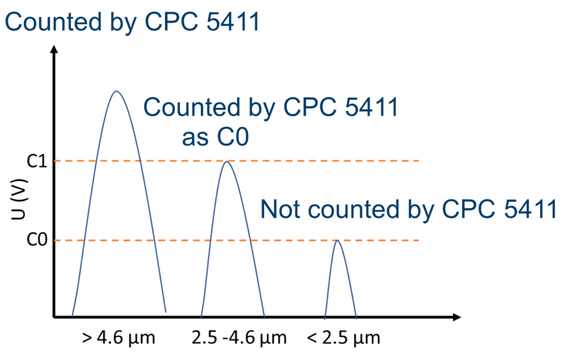


- Freezing point of 18°C
- Can swell various plastic components

Characterisations

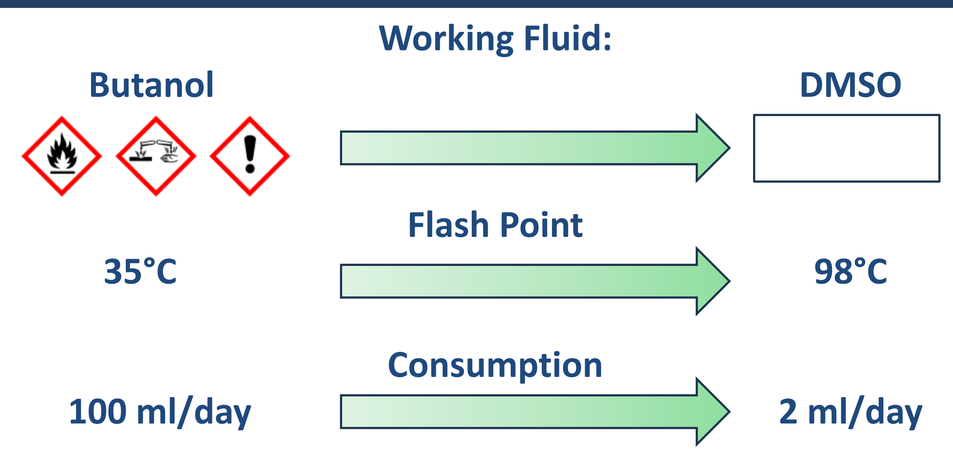






- D50 Cut-Off diameter adjustable with saturator and condenser temperature changes
- Particle growth suffers at lower saturator temperatures, which the C1/C0 value indicates

Advantages of DMSO as a Working Fluid



Miscible with water to improve freezing point to -100°C

No odour

Further Recommendations:

- Higher Laser power or lower response threshold to balance smaller particle growth
- Swelled plastic components can be exchanged with silicone or trimmed

References

a) Bischof, O. F., ISBN: 978-3-95806-629-8, 2022.
b) Fung K. et al., Atmos. Chem. Phys., **22**, 2022.
Weber, P. et al., Aerosol Research, **1**, 2023.
Kirchhoff S. et al., in preparation, 2025.

Acknowledgements

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