Aging soot particles at atmospherically relevant ozone concentrations and after coating with α-pinene for 16h in a well-mixed continuous flow aerosol chamber.

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Can soot particles form clouds?

1. Scan me
2. Watch me

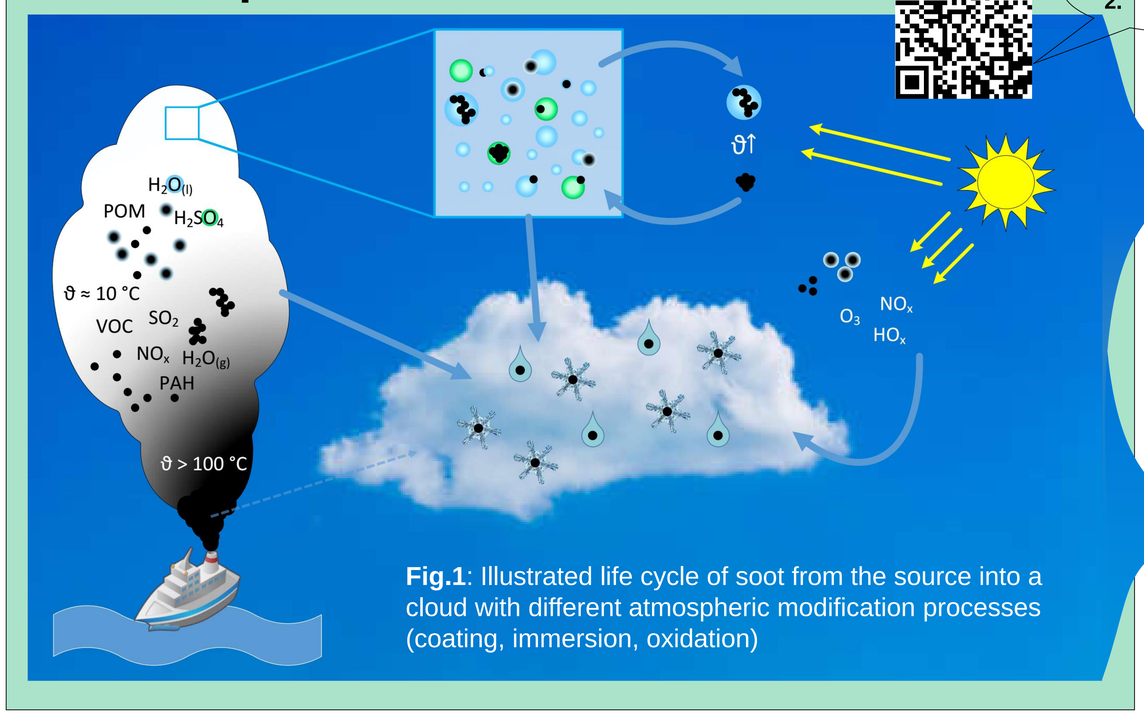
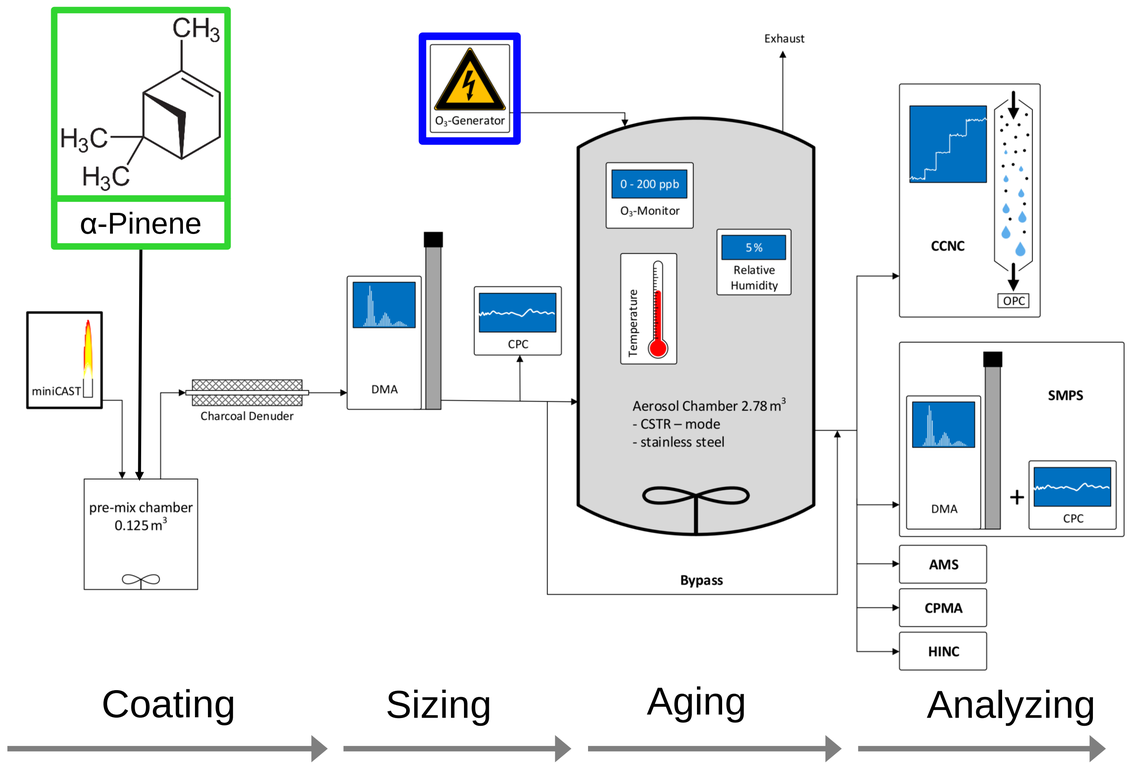
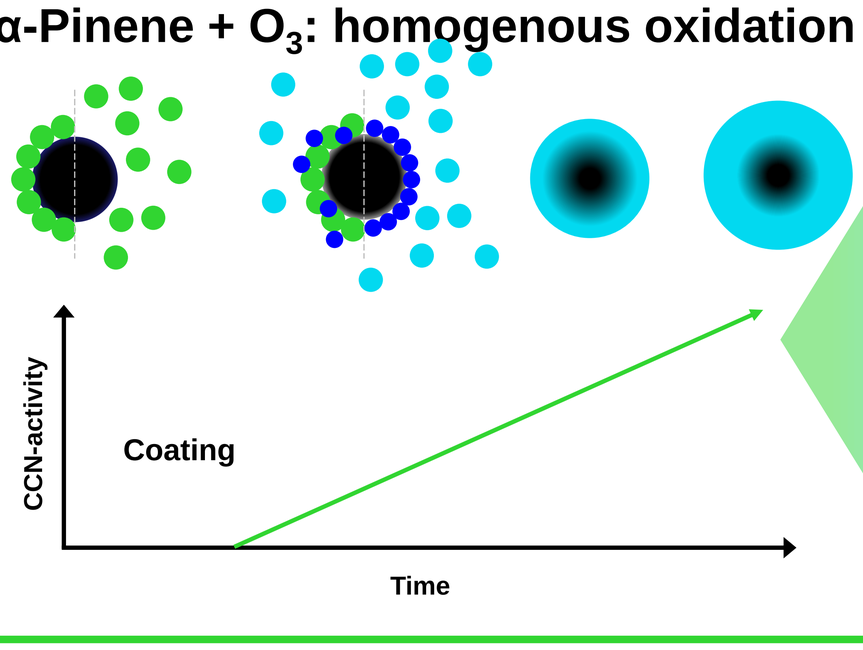


Fig.1: Illustrated life cycle of soot from the source into a cloud with different atmospheric modification processes (coating, immersion, oxidation)



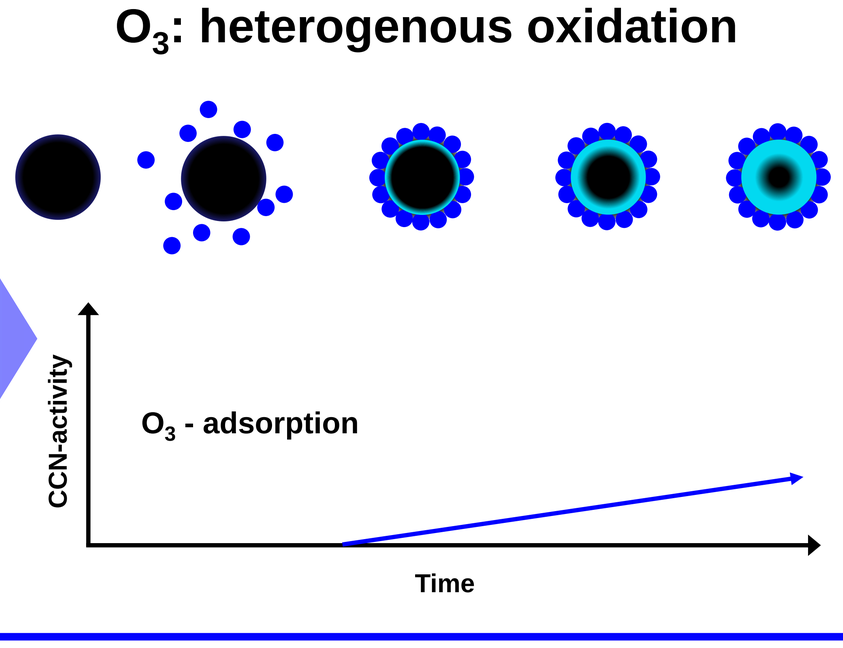
α-Pinene + O_3: homogenous oxidation



Conclusion

- BrC becomes CCN-active **faster** than BC **upon** exposure to O_3
- CCN-activity ↑ with α-pinene + O_3
  - **no difference** between BC and BrC
- Gas phase oxidation of α-pinene and condensation

O_3: heterogenous oxidation



Experimental approach: Continous-flow stirred tank reactor

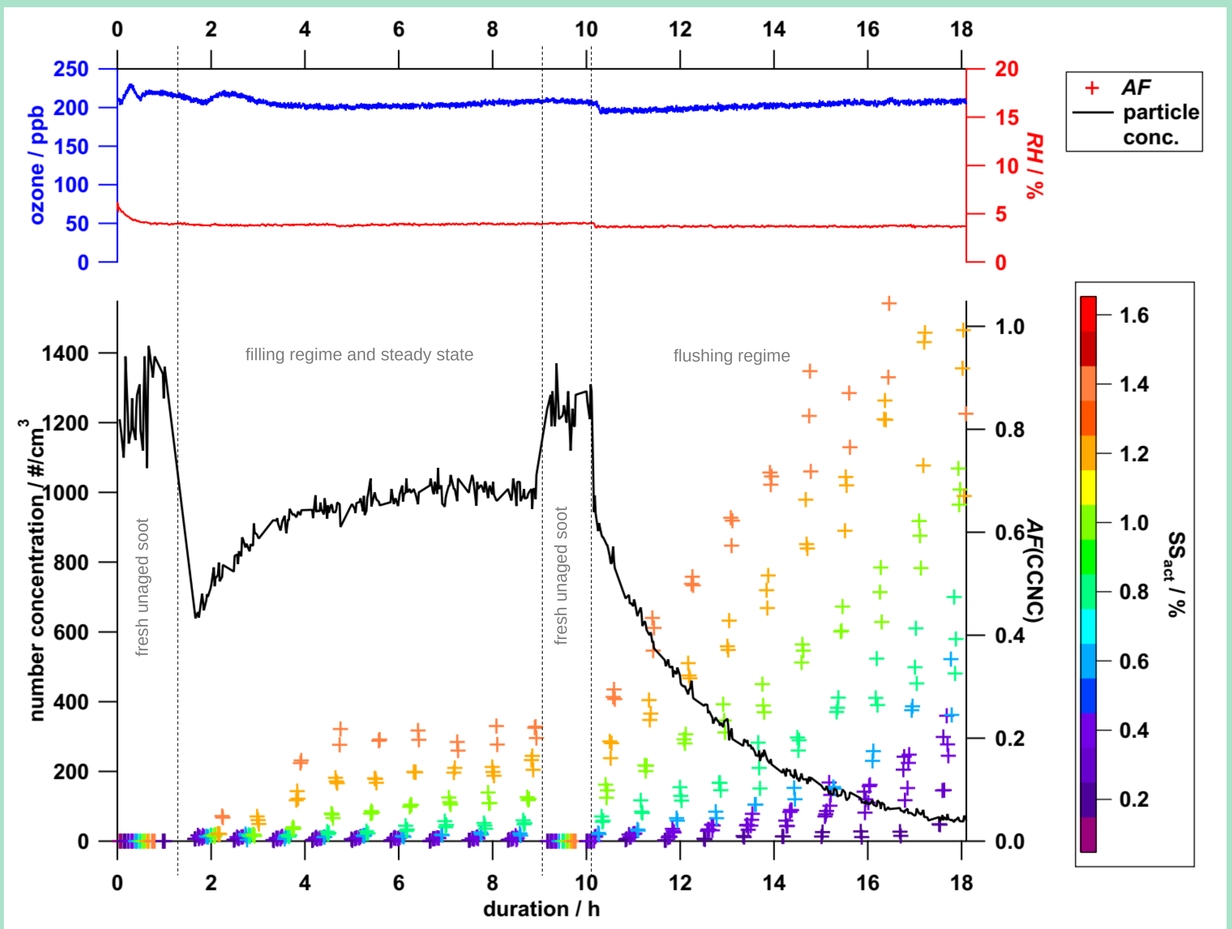


Fig.2: Full data set for an experiment in a CSTR with **100 nm soot particles.** The different experimental stages are defined by the filling and flushing of the tank reactor. The duration is not equal to the particle age.

Results

	Brown Carbon (BrC)	Black Carbon (BC)
fuel / air - ratio	1.03	0.95
organic carbon content	30 – 60%	≈ 10%

super saturation	activation time (t_{act}) / min			
	O_3		α-Pinene +O_3	
0.4%	---	567	---	420
0.6%	497	257	---	208
0.8%	313	139	---	116
1.0%	212	90	---	79
1.2 %	151	68	---	46
1.4 %	116	30	733	32
1.6 %	---	---	568	---

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