



College of Environmental Sciences and Engineering
Peking University

Problem with lens/capture vaporizer for the PKU TOF-ACSM

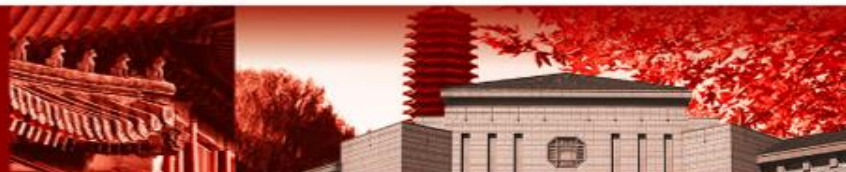
Reporter: Yan Zheng **Position:** Master Student

Institution: College of Environmental Science and Engineering, Peking University

Supervisor: Qi Chen **Contact:** yan_cese@pku.edu.cn



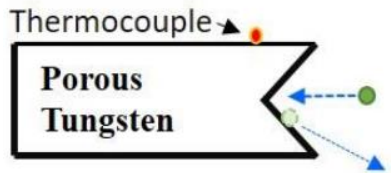
北京大学



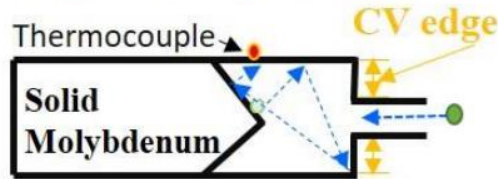
Capture Vaporizer

Schematic diagrams of the standard vaporizer (SV) and capture vaporizer (CV)

Standard vaporizer



Capture vaporizer



(Weiwei Hu, et al, 2016)

Capture vaporizer:

more collision → more complete decomposition → larger ratio for smaller fragments (smaller m/z)

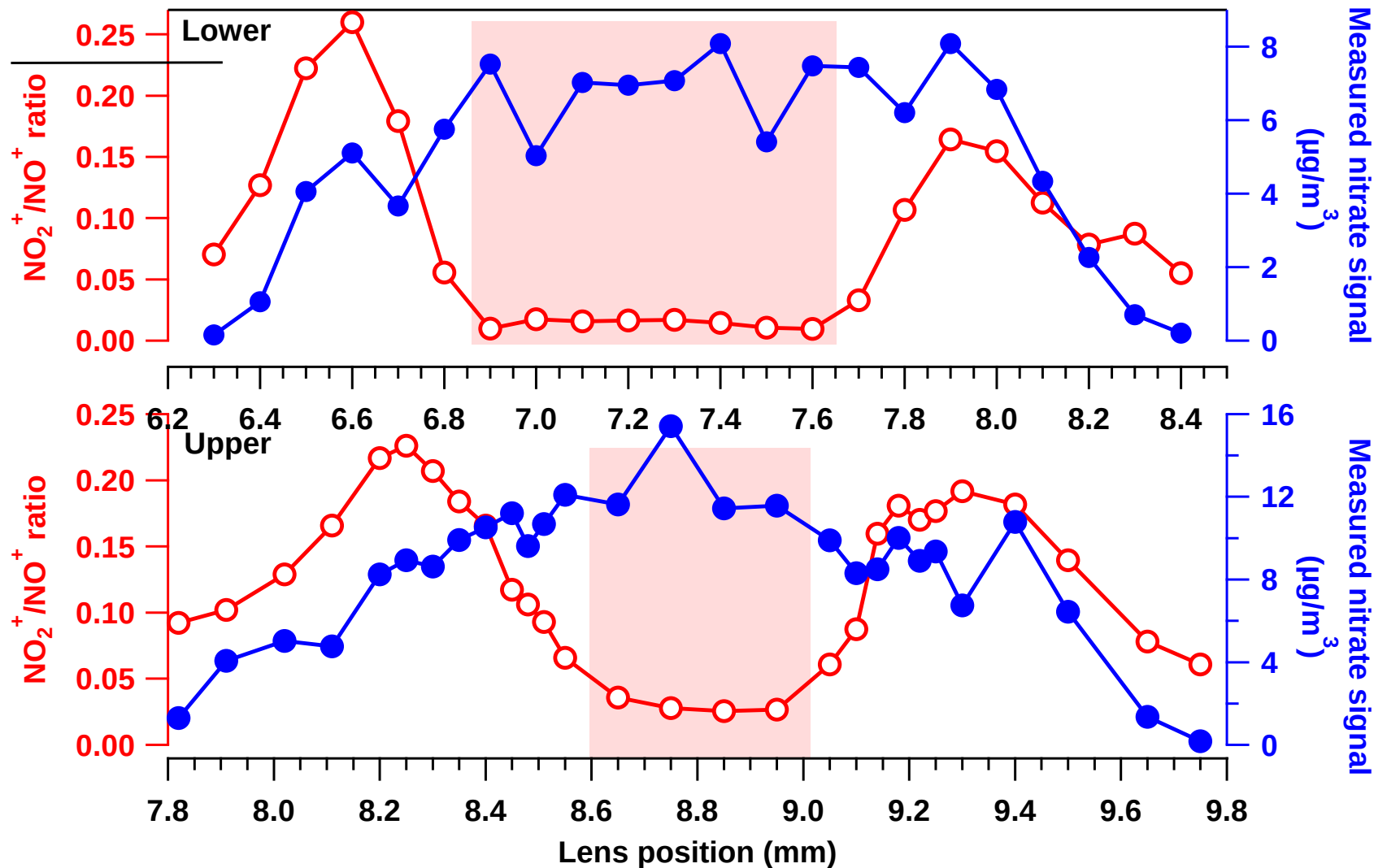
m/z 30 vs 46:

~ 2:1 for standard vaporizer

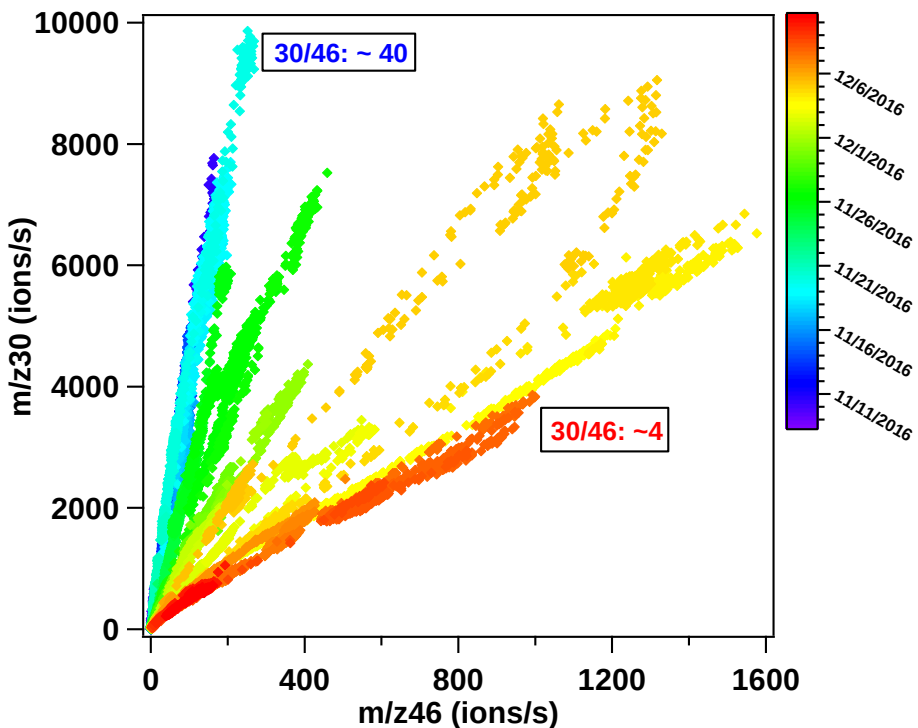
at least > 10:1 for capture vaporizer

Lens Alignment

m/z 30 vs 46 at center: > 20

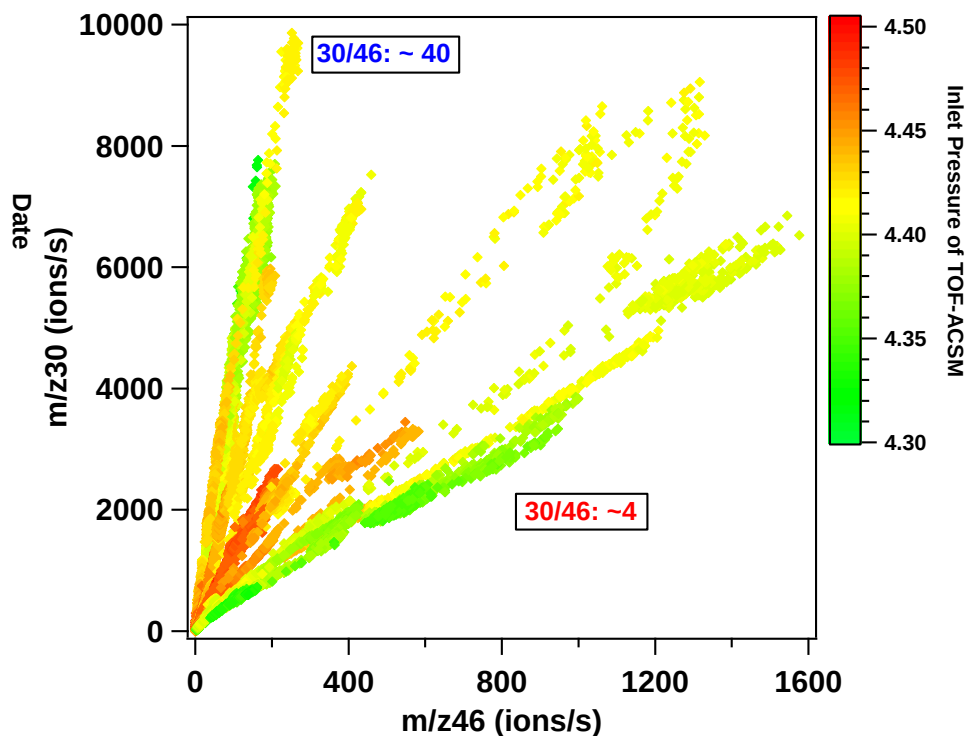


m/z 30 vs 46 ratio with time



- With lens position unchanged, the 30 vs 46 ratio decrease with time.
- At the end of our winter campaign, the ratio is nearly 4, which looks like the standard vaporizer.

m/z 30 vs 46 ratio with Inlet Pressure



- Inlet pressure does not change much during the campaign.

Why?

Fragment Table Adjustment for Capture Vaporizer

From Weiwei Hu, ToF-AMS with Capture Vaporizer

<i>m/z/ion</i>	Frag_sulfate	Frag_SO ₃	
		SV (default)	CV
18/H ₂ O ⁺	Frag_SO ₃ [18]	0.67*frag_SO ₃ [64], 0.67*frag_SO ₃ [48]	0.56*frag_SO ₃ [64], 0.56*frag_SO ₃ [48]
32/S ⁺	Frag_SO ₃ [18], Frag_H ₂ SO ₄ [32]	0.21*frag_SO ₃ [64], 0.21*frag_SO ₃ [48]	0.05*frag_SO ₃ [64], 0.05*frag_SO ₃ [48]

(Weiwei Hu, et al, 2016)

From us . ToF-ACSM with Capture Vaporizer

<i>m/z/ion</i>	Frag_sulfate	Frag_SO ₃	
		SV (default)	CV
18/H ₂ O ⁺	Frag_SO ₃ [18]	0.67*frag_SO ₃ [64], 0.67*frag_SO ₃ [48]	0.44 *frag_SO ₃ [64], 0.44 *frag_SO ₃ [48]
32/S ⁺	Frag_SO ₃ [18], Frag_H ₂ SO ₄ [32]	0.21*frag_SO ₃ [64], 0.21*frag_SO ₃ [48]	0.14 *frag_SO ₃ [64], 0.14 *frag_SO ₃ [48]

Thanks for your attention!

Q & A