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Atmospheric Measurement Techniques Discussions

Interactive comment on "Chemical discrimination of the particulate and gas phases of miniCAST exhausts using a two-filter collection method" *by* Linh Dan Ngo et al.

Anonymous Referee #1

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General Comments

In this manuscript the authors describe results of an experimental study of the chemical composition organic gases and particles sampled from the exhaust of a model combustion system (miniCAST) that is commonly used for conducting studies of combustion products under well controlled conditions. Particles were first collected on a quartz fiber filter and then gases that passed through the filter were collected on a second filter that was coated with black carbon to enhance adsorption efficiency. The filters were analyzed directly using a number of techniques, including two-step (desorption and ionization) laser mass spectrometry, secondary ion mass spectrometry, and

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Discussion paper

micro-Raman spectroscopy. Mass spectra were analyzed using principal component analysis. The major focus of the analysis was soot particles and PAHs, which are an important class of compounds formed by incomplete combustion, some of which are known to be carcinogenic. The experiments and data analysis seem to have been very carefully done, and the interpretation of the results was also very thorough. The manuscript provides a useful demonstration of the types of information that can be obtained on combustion products using this two-filter sampling method and suite of analytical instruments. I think it will be suitable for publication in AMT after the following comments are addressed.

Specific Comments

1. It is well established that quartz fiber filters (such as the front filter used to collect particles) adsorb organic vapors quite well. Was anything done in this study to evaluate the effect of this on the results and data interpretation? If not, then I suggest some vapors of standard PAHs with a range of volatilities be sampled and analyzed using this system. Alternatively, if others have conducted such studies then the authors could review the results of that work and discuss its consequences for the sampling and measurement approach employed here.

2. I found the Results and Discussion section rather challenging to read, due primarily to the somewhat monotonous style in which each observation was described in detail and then a possible explanation was provided. This made it difficult for me to differentiate important observations from minor ones. Although this made for a very thorough presentation, I'm not sure that readers will get the important take-away messages until they read the Conclusions (which may be all they choose to fully read). I suggest that the authors make a greater effort to emphasize the major points in each section of the manuscript, and perhaps eliminate some of the discussion that is mostly just minor observations with speculative explanations.

Technical Comments

Line 46: It seems unlikely that reviews published in 2011 and 2014 cover advances made over the last decade. Sentence should be reworded.

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