Atmos. Meas. Tech. Discuss.,
doi:10.5194/amt-2018-127-RC2, 2018

Atmospheric Measurement Techniques Discussions

Interactive comment on "Evaluation of cation exchange membrane performance under exposure to high Hg^0 and $HgBr_2$ concentrations" *by* Matthieu B. Miller et al.

Anonymous Referee #1

Received and published: 27 July 2018

Miller et al. report long-awaited QA/QC testing of polyethersulfone cation exchange membranes (CEMs) for atmospheric divalent reactive Hg (RM) quantification. RM, operationally defined as the sum of particle bound Hg and gaseous oxidized forms of Hg (such as HgBr2, studied here) is difficult to pre-concentrate and quantify. Conventional, denuder-based, techniques are increasingly criticized and CEMs are an interesting alternative. The study addresses two key aspects: RM retention (the purpose of the CEMs) and Hg(0) retention (an unwanted artefact). The experimental design is well described and smartly designed; generally this is challenging work because HgBr2 is reactive and labile. Despite a number of experimental improvements (suggested by Referee 1) that could be explored in future work, I find that the authors are to be com-

mended for their rigorous approach. I appreciate that both the main text and SI contain descriptions of problems and unexpected issues; this is very important for future R&D on CEMs. The MS is generally well written and referenced. The findings that no significant Hg(0) artifact occurs at high levels, and that the RM is retained >99% efficiently, is encouraging news to the atmospheric Hg community. It is the key step in further deploying CEMs for atmospheric Hg speciation research and monitoring. I strongly recommend the MS for publication in AMT.

minor comments: L40 Please provide references for the 'demonstrated interferences and artifacts' of current GOM and PBM monitoring techniques. L181. "...by digestion in an oxidizing solution. ...(EPA)". I know that readers can look up the EPA method, but it could be informative to add a few details on the digestion method, for ex. (1N HCl, 12h, 80oC).

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2018-127, 2018.