Atmos. Chem. Phys. Discuss., 12, C4043–C4045, 2012
www.atmos-chem-phys-discuss.net/12/C4043/2012/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "On dithiothreitol (DTT) as a measure of oxidative potential for ambient particles: evidence for the importance of soluble transition metals" *by* J. G. Charrier and C. Anastasio

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Received and published: 26 June 2012

This is a very well conducted study, which shows novel findings about the role of metals in oxidative properties of ambient aerosols. The manuscript provides evidence that the DTT assay used as a measure of PM oxidative potential is not a "one species" (e.g. quinone) driven method, which it was used to be considered in research community, but rather involves multiple species. However, based on the present results, I do not think that the authors can conclude that metals dominate the overall DTT activity of ambient particles. There are certain concerns which should be considered before making such

strong statements:

1. The authors used individual pure metal solutions. I do not think these stock solutions exactly represent the metals in ambient PM matrix which might have been in various oxidation states together and complexed with other species (e.g. organic compounds). Thus, the actual chemistry of metals' action and their contribution in DTT activity of ambient PM might be substantially different than what is estimated in their experiments.

2. As deduced from the above point, the estimation of DTT activity in a hypothetical PM (Figure 5) based on the limited lab results using only metals and quinones/PAHs, might include huge uncertainties. It appears from the previous work on DTT assay that there are not just quinones which are active in this assay, but an array of organic compounds having a wide range of volatility profiles as shown in Biswas et al., 2009 and Verma et al., 2010. In fact these studies highlight a point that the association between organic compounds and DTT is not purely based on co-variability with the metals as attributed in this study, but there is mechanistic evidence about the active role of these compounds in DTT activity.

3. As authors pointed out themselves that DTT activity measured on the stored filters does not include the contribution from semi-volatile species, I think it is a serious issue which makes it difficult to compare with the estimated summed contributions from the measured metals. As reported in Table 3, there is a very wide range of DTT activity (0.005 -0.170 nmol/min/ug) in different studies. Thus, it is difficult to say that the measured activity on those stored filters (0.015 – 0.075 nmol/min/ug) represents the real measurement in ambient PM.

Overall, I think that the manuscript is an important piece of work in the direction of measuring oxidative properties of aerosols and merits publication in the journal; however, I do not agree with the oversimplification of their results that metals uniformly dominate in the oxidative potential measured by DTT assay.

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