

Interactive comment on “An instrument for the rapid quantification of PM oxidative potential: the Particle Into Nitroxide Quencher (PINQ)” by R. A. Brown et al.

Anonymous Referee #1

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The authors present an instrument for quantifying PM associated ROS using 9,10-bis(phenylethynyl) anthracene-nitroxide, (BPEAnit), as probe. Particles were collected directly by a combination of a steam-aided growth chamber and a miniature cyclone with added reaction solution. Particle losses, sensitivity and response time are discussed in detail, exemplarily by analyzing cigarette smoke.

Major comments:

1. The instrument is not sufficiently described, e.g. size data of the “Insoluble Aerosol Collector” (IAC) should be added to estimate the flow regime.
2. The authors stated that the instrument is measuring ROS of particle matter (PM) – is

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that correct? ROS in gasphase (not associated completely with PM, e.g. H₂O₂) should be collected too, if the gas/particle distribution is shifted towards particles (droplets) after adding condensing water vapor. The relevance of this process should be discussed. If important, loss of gaseous ROS must be determined or measures as e.g. installing a charcoal denuder prior to PM collection should be considered. Perhaps the term “particle” should be replaced by “aerosol”, defined as mixture of gas, particles and droplets.

3. In section 1 several probes and collection devices reviewed. It will be helpful, if the probe dependent targeted ROS species (O-centered-, C-centered-radicals, ...) will be discussed more detailed to enable interpretation of the different end-points.

Minor comments:

Page1 line 18: Replace “...(Nel, 2005)(Penttinen et al.,2001); and ...” by “...(Nel, 2005; Penttinen et al.,2001) and ...”

Page 2, line 26: “. . .are only sensitive to narrow ranges of ROS species; making them unsuited for quantification of total oxidative potential.” Here a more detailed discussion on determined ROS species will be helpful

Section 1.3: Subtitle should be replaced by “online collection techniques”, as chemical assays are discussed in section 1.2.

Page 5 line 19 and page 6 line 9 and 10 and some other occurrences: “. . .”sample resolution” means “. . .time resolution. . .”

Page 7 line 7-8: Where is the aerosol flow rate measured?

Page 8 line 9: A mass flow in g.min⁻¹ will be more exact, additionally the dew point temperature of the supersaturated aerosol flow will be a vivid parameter.

Page 8 line 13: Why is the excess condensation drain volume not measured for calculation of the steam dilution factor? Can the excess drain water be analysed further for

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cross checking particle losses and removal of gaseous components?

Section 3.1.2: Did the authors check, if the charcoal denuder really removes all ethanol vapour from DEHS particles? If there is only a small amount of ethanol left on the surface of the particles, they still have a hydrophilic character.

Page 11 line 29-30: Particle mass increases with 3rd order to particle diameter/size, not exponentially Page 12 line 10 and page 16 line 3: "Sect. 0" is not defined

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