

Interactive comment on “A review of experimental techniques for aerosol hygroscopicity studies” by Mingjin Tang et al.

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The comments are attached.

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The manuscript “A review of experimental techniques for aerosol hygroscopicity studies” presents a comprehensive and systematic review of the techniques used to study hygroscopicity of aerosols. The experimental techniques are classified into four types, according to how samples are prepared. For each method, besides experimental techniques, typical applications of this method to aerosol hygroscopicity study are provided. Finally, the future direction to improve these techniques are suggested, including improving these methods to use in more variable ambient environment (high RH, low pressure, low T), conducting more instrument inter-comparisons and investigating other physicochemical properties of aerosol together with hygroscopicity.

A comprehensive review of the techniques used to study aerosol hygroscopicity is lacking up to now, to the best of my knowledge, although previous papers well summarize some techniques, especially the HTDMA techniques (Duplissy et al., 2009) and techniques to study physicochemical properties in general (Ault and Axson, 2017). Therefore, this manuscript would be beneficial to ACP readers. The manuscript is well written and clearly organized. I recommend publication of this manuscript in ACP after a few minor comments are addressed.

1. The authors discussed the advantages and disadvantages/problem of each technique. In the summary part, I suggest authors to add a table to summarize these features so that readers can get an overview and this could somehow work as a guideline when one reads a paper on aerosol hygroscopicity studied using a certain method and chooses a suitable technique in their research.
2. Some studies on other physicochemical properties are discussed in this manuscript. While most of them are relevant to the topic of study, some may not be the focus of this manuscript, such as lines 1102-1105, 1232-1236, 1380-1383, 1400-1403. Condensing these texts might be desirable. Also the lines 1042-1051 (and Fig 15, 16) discussed the application of Raman spectroscopy to study heterogeneous reaction. Since the application of Raman spectroscopy to hygroscopicity has been demonstrated earlier in the manuscript, I suggest omitting this part, especially considering the figures are not considered to be officially published yet.
3. Line 1575, it might be worth noting that “Aerosol Time-of-Flight mass spectrometer” is a single particle mass spectrometer, e.g. specify it by adding the abbreviation.
4. Some texts are underlined (such as line 620 and other part). Is this a typeset problem?

Fig. 1.

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