

## ***Interactive comment on “Simultaneous measurement of the relative humidity dependent aerosol light extinction, scattering, absorption and single-scattering albedo with a humidified cavity-enhanced albedometer” by Jiacheng Zhou et al.***

### **Anonymous Referee #1**

Received and published: 6 February 2020

#### General comments:

This paper described a new humidified cavity-enhanced albedometer (H-CEA) consisted of a broad-band cavity-enhanced aerosol extinction spectrometer (BBCES) and an integrating sphere (IS) for investigating the optical hygroscopic parameters including light extinction, scattering, absorption and single scattering albedo at 532 nm. The performance of instrument was evaluated by three standard chemicals (ammonium

C1

sulfate, sodium chloride and nigosine), the measured  $f(RH)_{ext}$ , scat agree well with literature reported values and model calculations and the estimated uncertainties were lower than 25%. The manuscript is well written and presents a valuable method in the field of aerosol hygroscopicity measurement. I recommend this manuscript to be published after the following issues to be addressed and modified.

#### Specific comments:

1. Page 1, line 21: “from 10% to 90% RH” should be “from 10 to 88% RH”.
2. Page 1, line 26-27: please cite some references to support this claim (Moise et al., Chem Rev, 2015; Tang et al., Chem Rev, 2016; Shrivastava et al., Rev Geophy, 2017; etc.).
3. The first paragraph of Introduction is not logical and coherent, and should be rewritten. For example, adjusting the order of sentences.
4. As shown in Figure 6, 7 and 8, the measured  $f(RH)_{ext}$ , scat agree well with literature reported values and model calculations, however, experiments were conducted in range of 10-88% RH, not up to 90% RH. How about the performance of the H-CEA at high RH, especially at 90% RH?
5. Stability is a key factor to evaluate the application of the H-CEA, especially for field observation measurements. However, only the RH control of humidifier system had been checked for a relatively long time (8 h) in this manuscript. As to the influence of water vapor on measurements, only 40 min data were presented in Figure 4; furthermore, the performance of optical devices, including laser source, CCD and PMT may also change in a long-time measurement. More details about this aspect need to be given.