

Short comment on:

Real refractive indices and volatility of secondary organic aerosol generated from photooxidation and ozonolysis of limonene, α -pinene, and toluene” by Kim and Paulson

This paper provides valuable information on refractive index for biogenic and anthropogenic SOAs, generated under various initial concentrations of HCs and NO_x and TD temperatures.

In this paper and Kim et al. (2012), the refractive index (RI) at 532 nm are reported, while the RI values at 670 nm reported by Barkey et al. (2007) and Kim et al. (2010). Wavelength dependence of the real part of the RI should also be taken into account in the “atmospheric implications” section (Fig.6), as shown the wavelength dependence of the RI values for the α -pinene-SOAs (ozonolysis and photooxidation) and toluene-SOAs (photooxidation) in the literatures (Yu et al. 2008, Nakayama et al. 2012, 2013).

In Figure 3, the real part of RI values for the toluene-SOAs generated under different HC/NO_x conditions are shown as a function of particle diameter. Nakayama et al. (2013, Fig. 6) showed that the real part of RI at 532 nm for the toluene-SOAs slightly increased as increasing [NO_x]_{ini} (decreasing HC/NO_x ratio) as well as increasing particle size and O/C ratio of the SOAs. The higher O/C ratio of the toluene-SOAs (O/C = 0.64-0.73, Nakayama et al. 2013) than those for the α -pinene-SOAs (O/C = 0.43-0.47, Nakayama et al. 2012) may contribute to the observed difference in the real part of RI, although non-negligible value of imaginary part of RI ($0.0010^{+0.0007}_{-0.0008}$ at 532 nm, Nakayama et al. 2013) might also contribute to the real part of RI for the toluene-SOAs under high [NO_x]_{ini} conditions.

References

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