

## ***Interactive comment on “A shape model of internally mixed soot particles derived from artificial surface tension” by H. Ishimoto et al.***

### **Anonymous Referee #1**

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General comments: This paper describes shape models for soot and internally mixed soot and their optical characteristics. This kind of work is important and essential to understand microphysics and to analyze observations correctly. In that sense, the paper is suitable for AMT. The paper is well written, generally.

Specific comments: The descriptions on the iteration procedure for calculating mixed soot particles are difficult to understand. How many iterations are necessary to obtain  $Wr=20$ ? What is the relationship between relative humidity and  $Wr$ ? What is the relative humidity in Figs. 7-9?

Lidar ratio values should be discussed in more details. Lidar ratio values at 355 nm and 532 nm reported in observational studies should be summarized. In my understanding, the observed lidar ratio at 355 nm was smaller than 532 nm in forest fire cases. It looks

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the wavelength dependence in Fig. 8 is opposite for small  $W_r$ . However, it looks good for large  $W_r$ , for example, A-7  $W_r=20$ . The depolarization ratios are also close to the observation, in this case. Considering the lidar ratio values, it may be more appropriate to consider large  $W_r$ , even if the depolarization ratios are not well reproduced.

Lidar ratios calculated with MG and CS should be also presented.

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