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Interactive comment on "Combustion characteristics of water-insoluble elemental and organic carbon in size selected ambient aerosol particles" *by* K. Wittmaack

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It was quite satisfying to me that Referee #1 (R1) , much like Referee #2, arrived at the conclusion that the method presented in my paper constitutes a "notable step forward in the difficult field of EC/OC differentiation in ambient aerosols and should therefore be published in ACP", subject to some minor changes.

R1 pointed out that interpretation of data obtained by common thermo-optical analysis of EC and OC is hampered by charring. This problem, however, is avoided if the sample is heated in an oxidative gas like ambient air, as was the case in my work. In this sense the combustion conditions that I have used have much in common with the ap-

proach advocated by Cachier (1998) and coworkers. As to the humic-like substances (HULIS) in aerosol matter, significant if not large fractions of this class of OC have been found in aqueous extracts of fine atmospheric aerosols (Krivácsy et al., 2000). Hence, only the water-insoluble fraction of HULIS should have been present in the samples analysed in my study. Undoubtedly, diesel soot particles cannot be characterised completely using only SEM and EDX. The suggestion of R1 to apply Raman spectroscopy for an advanced characterisation of the water-insoluble carbonaceous matter is meaningful. I will discuss these three issues in the revised manuscript. I agree with R1 that the results of my study do not provide immediate means for interpreting peaks in thermograms of ambient aerosols. This is the reason why I cautiously stated that "These results provide at least a qualitative explanation for the complex thermograms reported previously."

Response to Specific Comments

The suggested rearrangement of the text in section 2 is debatable. I will partly comply with the recommendation of R1, i.e., I will move lines 1-13 of Methods to the end of the Introduction. I will specifically mention that the collection foils were not greased. Conceivable bounce-off does not preclude the kind of analysis described in my paper, but it can cause interstage losses and carry-over of particles to downstream stages. The latter effect may contribute to a broadening of the measured distribution.

Figure 2. Panels (a) and (b) were purposely taken from samples collected in impactor stages 4 and 3 to document the similarity in morphology of the individual soot particles sampled in different aerodynamic size ranges.

Section 3.1. The employed value of 2 g/cmˆ3 for the mean mass density of aerosol matter is a rough average of data discussed in the literature (Berner and Lürzer, 1980; Wittmaack, 2002). Possible deviations from this mean value by about +/-20% are much smaller than the size dependent variations in coverage shown in Fig. 1b.

Section 3.2. Charring should not have occurred in my study, as discussed above.

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Response to Technical Comments

Section 3.1. “Coarse” vs “Rough”. I appreciate the fact that R1 apparently cares a lot about an optimum use of the English language in scientific publications. So do I. In view of the fact that the suggested change concerned only a single word, I assume that the remainder of the text passed R1’s inspection for grammar and style. There is a little problem though. Taking a second look at the wording myself, I found that neither “Coarse” nor “Rough” are terms that I should have used. For what I meant to say the most appropriate word is “Gross”.

Anyway, all comments of R1 will be helpful in trying to improve the quality of my paper.

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