Dear Editor Kanaya and Reviewer #1,

Thank you for the careful evaluation of our revised manuscript. We have implemented the suggested technical checks as described below. Editor and reviewer comments are in black text and our responses are given in blue text.

1. If not separately defined, notation of "ambient MAC_BC" in line 19, "MAC_BC,amb" in lines 20, 741 and 743, "MAC_BC,mixed" in lines 59 and 60 (equation (2)), MAC_BC,ambient in equation (4) can be unified? MAC_BC,denuded and MAC_BC,bare should be different due to the coating remaining after heating but their use in lines 20, 60, 148, 564, 586, 591, 593, 595, 605, 606, 715, etc. would be better rechecked.

We have unified the notation for the ambient MAC of BC so that all instances are described as "$MAC_{BC,ambient}$". In addition, we added a small clarification before Eq. 4 on line 147 to explicitly indicate that within the denuding method we assume that the denuded MAC of BC represents the bare MAC of BC. Specifically, we added the following statement: "(i.e., by assuming that $MAC_{BC,denuded} = MAC_{BC,bare}$)".

Figure S1: All gray color of BS-containing particles is looked the other colors by overlap with all particles. I suggest to use such as mesh rather than semi-transparent color.

We tried using different types of meshes for this figure rather than semi-transparent color but it did not work well. Instead we decided to retain the semi-transparent shading but to add different types of line styles to the envelopes. We believe this is the best solution for being able to visually identify the three overlapping distribution.

Further modifications:

Now that the manuscript is accepted for publication we have also updated the 'Data availability' statement. This now states: "The data archive for this manuscript is available on Zenodo (http://doi.org/10.5281/zenodo.4290328)"