

***Interactive comment on* “Investigation of the connections between atmospheric new particle formation and organics at an urban site of Beijing” by Z. B. Wang et al.**

Anonymous Referee #2

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The manuscript uses data from 17 nucleation events measured in Beijing in 2008. As growth of the newly formed particles can only be explained to a minor part by sulfuric acid, it is assumed that the missing condensing gases consist of highly oxidized organics which cause the growth. Average concentrations of the condensing organics are calculated from the observed growth rates and the nucleation rates are then compared with a number of different equations to describe different nucleation mechanisms involving sulfuric acid and the derived organics.

It has to be stated that the entire atmospheric data set of the 17 nucleation events has already been published and analyzed for H₂SO₄ nucleation by Wang et al., ACP, 2011.

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The method to test the data for the contribution of low volatility oxidized organics to the nucleation rate has been described in detail and tested by Paasonen et al., ACP, 2010, where results of 36 nucleation events at four different sites in Europe were analyzed. Therefore, both the data set as well as the method used for the additional analysis have been published before. Furthermore, it is a significant shortcoming that neither the precursor organics, nor the oxidizing agents, nor the low volatility organic oxidation products were directly measured. Instead, a daily average for the sum of the condensing organic species is derived in a very indirect way including many assumptions (role of O₃ and other oxidants neglected; OH is inferred from global radiation measurement; participation of inorganics such as ammonia for nucleation and growth is neglected, etc.). Altogether, the results, namely a range of correlation coefficients for the various nucleation mechanisms including organics, are a) all in a very similar range (0.67 – 0.73) and therefore no firm conclusion on the occurrence of any of the suggested nucleation mechanisms can be drawn; b) the results are all highly uncertain as admitted by the authors in Section 3.3 because of the many assumptions necessary to derive concentrations of organics (and differences between of nucleation mechanisms between R=0.66 and R=0.67 as mentioned in the conclusions (lines 10-12) are therefore meaningless); and c) the studied data set is only a minor extension to the existing data set from Paasonen et al., 2010.

Therefore, the paper lacks the required originality and the conclusions reached are not really significant at a level to warrant publication in ACP.

Minor comment: There are many instances where the text needs improvement in the use of English language and where inappropriate words or phrases have to be replaced.

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 3419, 2013.

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