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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Ice nucleation by surrogates for atmospheric mineral dust and mineral dust/sulfate particles at cirrus temperatures" *by* C. M. Archuleta et al.

H. Hung

hm.hung@mcgill.ca

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1.There must be some typos in Table 2. The vapor pressures for both equations become negative when T is less than 0 C.

2.Because the TEM image in Figure 2 shows that the aggregate of particle which is not spherical and the authors observe the thin coating of sulfuric acid can affect the ice formation in different behavior based on the mineral core in Figure 3, the authors should discuss if the treated particle is only partially coated by sulfuric acid and the ice nucleation from the treated particles is contributed by both coated and uncoated

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portions. In such case, is the mechanism of ice nucleation for the treated particles a combination of deposition and condensation nucleation?

3.Lines 15-18 in page 3410 are not correct. The nucleation rate should not be dependent on the ice fraction and also the retention time.

4.The data points in Figure 8 for Hung et al are not consistent with the original data. Please revise them.

5.There are several points should be explained as the authors compare their results with Hung et al as following:

a. Sulfuric acid vs. ammonium sulfate. Is the heterogeneous ice nucleation from both solutions comparable?

b. The thin sulfuric acid coating compares vs thick ammonium sulfate coating. In thick ammonium sulfate coating, there is mainly condensation nucleation. In the thin sulfuric acid with non-spherical core, the sulfuric acid solution may accumulation in the concave area and the dust core may not be completely coated. Deposition nucleation could play an important role in the thin coating.

c. The authors should discuss the possible impact of the non-spherical shape because it can increase the surface area and further reduce the j values in the results.

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 3391, 2005.