

Interactive comment on “Exploratory experiments on pre-activated freezing nucleation on mercuric iodide” by Gabor Vali

Anonymous Referee #2

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Review of “Exploratory experiments on pre-activated freezing nucleation on mercuric iodide” by Vali.

In this manuscript, Vali presents results from experiments carried out in the 1970s on the pre-activated freezing nucleation caused by mercuric iodide. A very thorough analysis of the data is presented, and the results are certainly interesting. Although mercuric iodide may not be atmospherically relevant, the results may be applicable to other substances of atmospheric relevance, as pointed out by the author. I support publication in Atmospheric Chemistry and Physics, after the author has adequately addressed the following minor comments:

1. The abstract is rather vague. The author may want to include some of the specific conclusions from Section 6.

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2. There are several typos throughout the document, especially Section 6.1. For example, see the following: Page 13, line 228; Table 4 Caption; Page 21, line 343, 349, 359; Page 23, line 376; Page 25, line 438; Page 27, line 498.

3. Figure 2. The figure caption states “cumulative nucleus spectra, $K(T)$ ”, but the y-axis states “differential concentrations, $k(T)$ ”. Are these the same thing? I assume cumulative is different from differential? I also suggest adding the equation that describes the cumulative concentration of INP to the manuscript, rather than refer to the equation in Vali et al. 2014. This way a reader will not have to look up another paper to fully understand the current paper.

4. Table 1. please indicate the units displayed in the table.

5. Table 2. This table took some time to understand. I suggest labeling the top row and include units. Also, in the figure caption, please indicate what “cutoff” represents.

6. Page 9, lines 184-185. “these differences are statistically significant to better than 001 % level.” What statistical test was used?

7. Results for Exp. I were presented (e.g. Table 3) before describing the temperature histories used in these experiments. I found this confusing.

8. Page 21, line 331. The symbol ω is used but only defined in Table 5. Should the symbol also be defined in the main text? Also, Table 5 is not referred to in the main text. Hence, the reader may not automatically find the definition for ω .

9. In Section 5.3, the results of this paper are discussed in terms of an adsorbed ice-like layer on the substrate. The author states “but none of the present results contradict the role of an ice-like layer in the PFN”. Do the results contradict the role of special features on substrates such as cavities, cracks, etc. in the PFN? I.e. do the result contradict the suggested mechanism by Turnbull [1950]? This was not clear to me.

10. Figure 18. This figure does not appear to be quantitatively consistent with the results presented in the current manuscript. The authors should adjust to make the

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figure more quantitatively consistent with the data or consider removing the figure.

11. Since the paper has 19 figures and 5 tables, I wondered if some of the figures and tables could be moved to the supplement to make the paper more succinct.

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