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Atmospheric Chemistry and Physics Discussions

Interactive comment on "On the influence of fuel sulfur induced stable negative ion formation on the total concentration of ions emitted by an aircraft gas turbine engine: comparison of model and experiment" *by* A. Sorokin et al.

Anonymous Referee #2

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Clearly I am missing the point of this paper. The Abstract says that the paper is presenting "A model which considers the formation and evolution of combustion ions in a combustor of an aircraft engine ...". The formation is not modeled at all. Three different values of ion production are evaluated as *inputs* to the model. No consideration of the hydrocarbon chemistry and initial chemical processes that generate the ions is mentioned. No parameters describing an aircraft engine combustor are included (pressure, temperature, fuel properties) other than residence times and fuel sulfur levels. So clearly the scope of the modeling effort needs to be better represented.

The only specific modeling that is carried out is the interaction between O_2^- and SO_2^-

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and the consequential formation of SO_4^- and SO_5^-. Lacking information about initial ion formation, no details are included regarding the initialization of the O_2^- concentrations and what that might depend on. Nor are any other terminal ions included in this model simulation. So competition between the sulfur ions and other possible terminal ions is not evaluated. Thus it appears to me (again, I clearly miss the point of this paper), that if the only process being modeled is the interaction between O_2^- and SO_2^-, it is almost trivial that increasing the amount of sulfur in the fuel will increase the amount of sulfur ions. It is not clear what bearing this has on ion processes in an engine with other exhaust species present.

Thus, the modeling that has been done is smaller in scope than suggested and the problem considered represents only the electron transfer from one species to another and doesn't seem representative of the situation in an aircraft exhaust with multiple potential terminal ions.

I do not see the value in publishing this paper.

Interactive comment on Atmos. Chem. Phys. Discuss., 3, 6001, 2003.

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Interactive Comment