

Interactive comment on “Predictions of diffusion rates of organic molecules in secondary organic aerosols using the Stokes-Einstein and fractional Stokes-Einstein relations” by Erin Evoy et al.

Anonymous Referee #2

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In this work the authors present measurements of the diffusion coefficients of a fluorescent organic tracer in secondary organic aerosol proxy compounds (citric acid, sorbitol, and a sucrose-citric acid mixture). They compare their measured diffusion coefficients with the predicted diffusion coefficients by the Stokes-Einstein relation. From this comparison they propose a parameterization of a fractional Stokes Einstein relation. The suggested fractional Stokes-Einstein relation seems to be a better model for predicting diffusion coefficients in SOA proxies, for the range of viscosities studied. The comparison is made as well for earlier work. The writing is clear and the data is presented in a comprehensive and clear way.

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Discussion paper



This work is of a great interest for the atmospheric science community and it is definitely suitable for publication in ACP. I would raise only few minor comments.

- 1) How dependent of the nature of the diffusing molecule are the parameters t and C? In the experiments the diffusing molecule was rhodamine 6D, which is quite a large molecule. How would the parameters change for smaller molecules?
- 2) Line 21, page 1. "...measured diffusion coefficients over eight orders in magnitude...". Diffusion coefficients of what? I would write "diffusion coefficient of organic compounds" or something similar.
- 3) I would include in the abstract how the diffusion coefficients were measured (fluorescence, rhodamine 6G...).
- 4) Is the photobleaching affecting the temperature of the films?

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