

## ***Interactive comment on “Classifying organic materials by oxygen-to-carbon elemental ratio to predict the activation regime of cloud condensation nuclei (CCN)” by M. Kuwata et al.***

**Anonymous Referee #2**

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Kuwata et al. report new CCN data to better understand how the atomic O:C ratio controls transition between solubility limited and molecular weight limited CCN activation regimes. The results quantify how O:C relates “insoluble”, “slightly-soluble”, and “soluble” regimes and the work may serve as a basis to explain observed empirical relationships of O:C with CCN activity. The manuscript is well-written, easy to follow, and suitable in scope on content for publication in ACP.

I would like to add to the excellent comment made by referee #1 on the speculated temperature dependence for pimelic acid. Christensen and Petters (2012) have demonstrated that the solubility vs. temperature curve for adipic acid shown in Figure A1

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can be retrieved from temperature dependent CCN data using a very similar instrument configuration as was used in this study. Their data demonstrate 1) that solubility quantitatively controls CCN activation for adipic acid, and 2) that that temperature can indeed lead to the regime change between slightly soluble and soluble as suggested in Section 4.1.2. The above cited study may be used to corroborate the authors' conjecture.

### Reference

Christensen, S. I. and Petters, M. D.: The role of temperature in cloud droplet activation, *J Phys Chem A*, 116(39), 9706-9717, doi:10.1021/jp3064454, 2012.

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