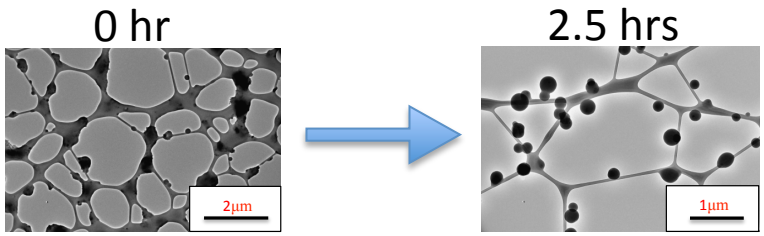
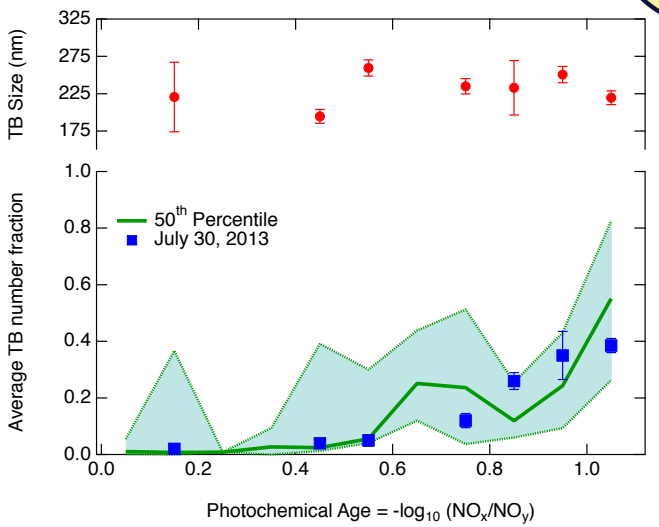
Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2018-41
Manuscript under review for journal Atmos. Chem. Phys.
Discussion started: 30 January 2018

Formation and evolution of Tar Balls from Northwestern US wildfires

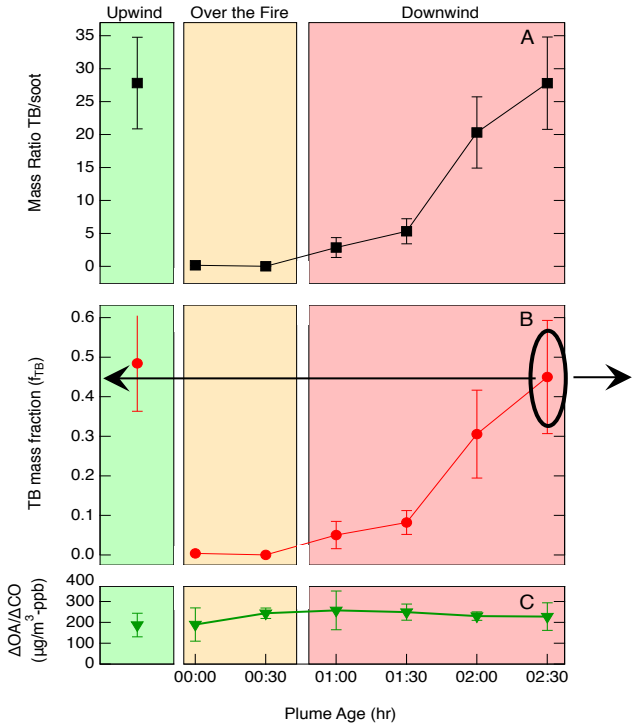
Arthur J. Sedlacek III[1], Peter R. Buseck[2], Kouji Adachi[3], Timothy B. Onasch[4], Stephen R. Springston[1], and Lawrence Kleinman[1]



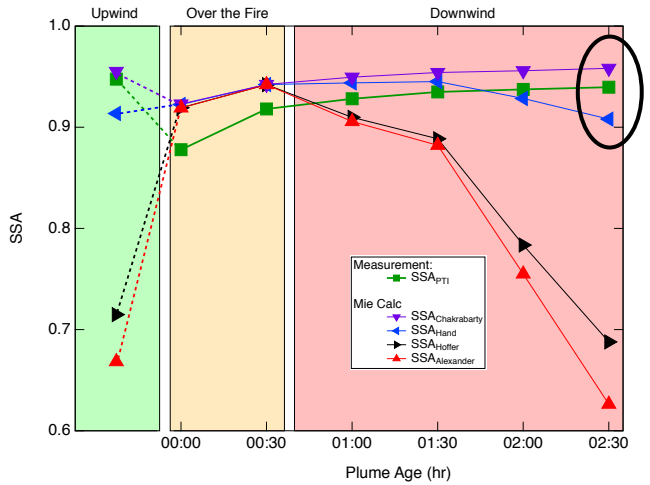


TB mass fraction, f_{TB}, estimated by combining TEM, AMS, and SP2

Assumption: **rBC mass (SP2) = soot mass (TEM)**



~50% of plume mass!
(1st quantification of f_{TB})



TBs are weakly absorbing: best fit to SSA observations (green) yield refractive index = 1.56 – 0.02i

TBs are likely a cooling agent.

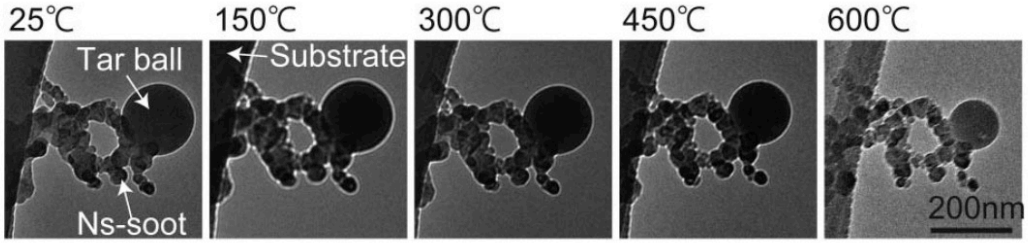
AEROSOL SCIENCE AND TECHNOLOGY
https://doi.org/10.1080/02786826.2017.1373181

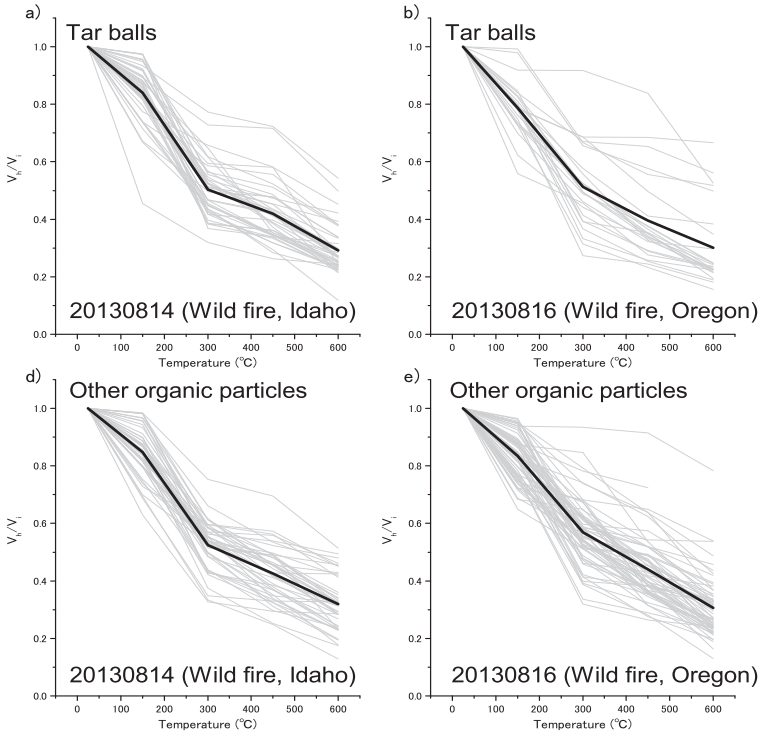
Taylor & Francis
Taylor & Francis Group

Check for updates

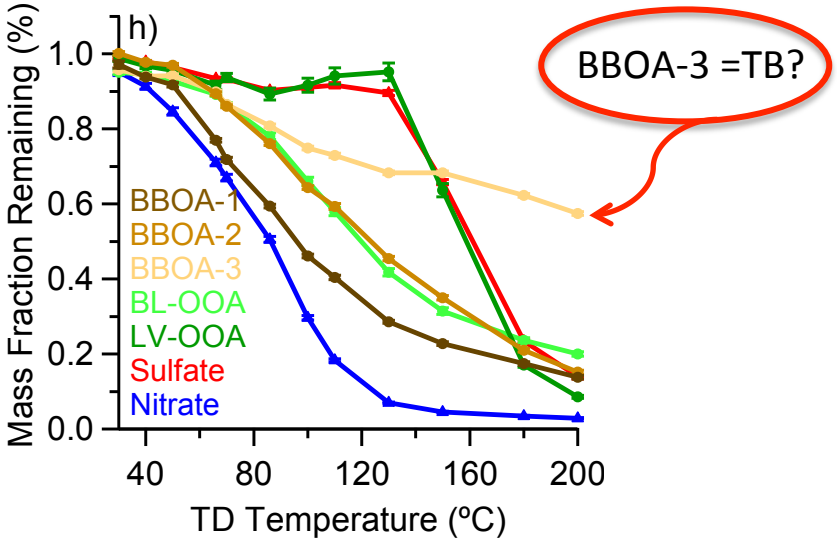
Volume changes upon heating of aerosol particles from biomass burning using transmission electron microscopy

Kouji Adachi[a], Arthur J. Sedlacek III[b], Lawrence Kleinman[b], Duli Chand[c], John M. Hubbe[c], and Peter R. Buseck[d]





- The results indicate that individual TB particles retain up to 30% of their volume when heated to 600 C.
- Single-particle results imply that organic particles consist of multiple types of organic matter having different thermal stabilities.
- The presence of less-volatile organic particles implies a risk in underestimating the amount of atmospheric OA particles.



TBs should be considered as a unique BrC aerosol class (possibly BBOA-3 of Shan et al,. 2017).