Comment on acp-2021-897
Anonymous Referee #2

Referee comment on "Stable carbon isotopic composition of biomass burning emissions – implications for estimating the contribution of C₃ and C₄ plants" by Roland Vernooij et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2021-897-RC2, 2021

Stable carbon isotopes in biomass burning (BB) emissions can be used to trace the contribution of C₃ plants and C₄ plants to various combustion products. However, isotopic fractionation of the emitted carbon compared to the burnt fuel is unknown or uncertain due to lack of the measurements. They studied a series of laboratory fire experiments and measured stable carbon isotope signatures in the pre-fire fuels and post-fire residual char as well as in the CO₂, CO, CH₄, OC and EC. The isotope fractionation found this study is very important for better estimate C₃:C₄ ratios in the isotope-based studies.

Major concerns:

Explanation of ¹³C-enriched in CO should be given.

The explanation of differences of ¹³C fractionation in C₃ and C₄ should be added. Is it due to fuel or combustion condition?

What is the reason for slightly more depleted EC compared to the previous studies?

Please estimate the C₃ and C₄ ratio by considering different fractionation occurring in the different processes for different fuels.