

Interactive comment on “An investigation on hygroscopic properties of 15 black carbon (BC) from different carbon sources: Roles of organic and inorganic components” by Minli Wang et al.

Anonymous Referee #1

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The manuscript describes the hygroscopic properties of 15 black carbon (BC) from different carbon sources using gravimetric method and DRIFTS. The authors found different BC had different mechanisms and controlling factors for equilibrium and kinetic water uptake, which mainly depended on humidity conditions. The 15 BC were characterized by many kinds of methods. The contents and constituents of OC and minerals/salts have great impact on the hygroscopic properties by this study. Therefore, it is recommended to publish on ACP after revision. Some and more detailed comments are included below:

1. In the experimental part, the author should give more information of BC sources.

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2. The particles should not pass through 100-mesh sieve (0.15 mm) only once, what is the particle size of the prepared BC particles? Different specific surface areas with different particle sizes will greatly affect the experimental results.
3. Lines 212-214: Why choose 30 minutes as the equilibrium time? Has the author conducted a series of equilibrium time gradient experiments to choose the preparing time?
4. Line 276: the “Si” should be changed to “Si-”.
5. Line 313: The data in Figure 1 must be not done only once experiment, the error bar should be added.
6. Lines 361-363: Expect the water-soluble salts, even the insoluble compound (such as H₂C₂O₄) could become water-soluble compound. The author can explain the phenomenon in this way.
7. Line 411: The absorption peaks of water were not unchanged, so the authors can refer to the spectra and previous study to ensure the position of those peaks. In figure 3, the signed peaks around 3600 cm⁻¹ are different from the strong peaks.
8. Line 411: In figure 3(a), 1000 in the abscissa is shown as 100 due to layout style.
9. Lines 496-500: The conclusions can be more credible if the author can add some photos of BC particles when discussing the influence of BC’s micro-control and mesoporous.

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