Response to the reviewers' comments on "Interpretable Machine Learning Quantifies Composition and Size Influences on Aerosol Spectral Absorption"

We would like to sincerely thank the editor for accepting our manuscript for publication in ACP. We are also grateful to Reviewer #2 for the helpful comment regarding the potential effects of aerosol microphysical properties on AAE and radiative forcing estimates. Following this suggestion, we have added a brief discussion in the final Conclusions section to acknowledge the possible influence of BC morphology and mixing state, while avoiding an unnecessary expansion of the manuscript scope. The modification is as follows:

Although this study demonstrates the importance of bulk composition and size-distribution parameters in controlling AAE, the optical properties of light-absorbing aerosols can also be modulated by particle-level microphysical characteristics. For example, BC morphology, from fractal to compact aggregates, and mixing state, including coating thickness, coating uniformity, and the spatial distribution of inclusions, may influence AAE and subsequent radiative forcing estimates (Luo et al., 2023, 2024, 2025). These effects are not fully captured by bulk properties alone and may contribute to the remaining uncertainty.