Benefits of Automating Battery Measurement Processing

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This study presents a structured approach for the treatment of battery measurement data, aiming to find the points at which we need to update our theories and methods when researching novel battery materials, e.g., sodium, magnesium, calcium, silicon, or spinel. Linking theoretical electrochemistry with characterization methods [1] is essential due to the high complexity of interlocking mechanisms in batteries. Consequently, the measurement data required to resolve such complexity transcends the abilities or time of any one researcher. With structural guidance from ontologies [2], methodological guidance from automation [3], and profound guidance from experts combined, we can advance the methods developed over the past decades for LFP and NMC batteries to novel chemistries. As a test case, we elucidate the methodological origin of wildly varying diffusivities reported for graphite, [4] as shown in Figure 1.

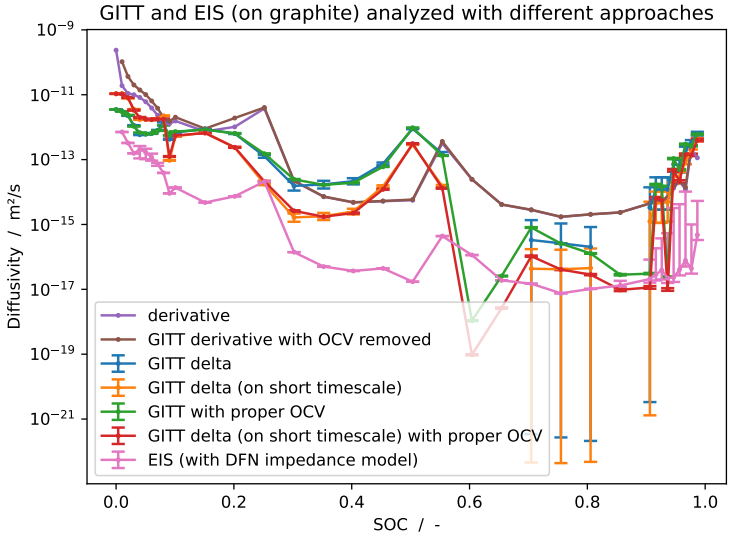

Figure 1: Comparison of diffusivities obtained with different measurement and data analysis methods.

References

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