

## Elucidating the Role of Hydrated Intercalation in Aqueous Zinc Ion Batteries

신재호, 최동신<sup>1</sup>, 이현정<sup>1</sup>, 박영빈, 정유성<sup>1</sup>, 최장욱<sup>†</sup>

서울대학교; <sup>1</sup>KAIST

(jangwook.choi@gmail.com<sup>†</sup>)

Aqueous zinc ion batteries (AZIBs), composed of a zinc (Zn) metal anode paired with a metal oxide cathode, are promising candidates for post lithium ion batteries. The bivalence of Zn opens up possibilities for multi-electron redox, which has spurred a fierce search for suitable cathode materials (namely metal oxides) that intercalate  $Zn^{2+}$  ions. Despite the recent rise in publications, however, little is known about the intercalation dynamics of  $Zn^{2+}$  ions. As such, there is much room to explore the interaction between these ions and their host cathode. In this respect, we focus on a type of vanadium oxide,  $V_6O_{13}$ , not only as an electrochemically promising material, but also as a platform with which key  $Zn^{2+}$  intercalation parameters can be elucidated. Electrochemical results are correlated with a series of synchrotron XAFS/XRD studies along with DFT calculations to understand the underlying reaction mechanisms. Interestingly, we find that 'hydrated intercalation' is crucial to facilitating  $Zn^{2+}$  intercalation kinetics. In this talk, I will correlate the electrochemical properties with the structural changes of the cathode and explain how water comes into play during this process.