Electrochemical quartz crystal microbalance studies of inert electrolyte cation roles during the electrochemical reduction of thin graphene oxide films

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The electrochemical reduction of graphene oxide films offers a promising method for precise control of the graphene oxide properties, important for applications in electrochemical capacitors, sensors, and electrocatalysis. While the primary role of an inert electrolyte is to maintain sufficient electrical conductivity, the choice of electrolyte can significantly influence the reduction behavior of graphene oxide films [1,2]. Notably, this effect appears to correlate with the size of the cation in the electrolyte, with trends in peak potential and other parameters following the Li -> Na -> K sequence. To better understand the influence of cation size in inert electrolytes, electrochemical quartz crystal microbalance (EQCM) measurements were conducted simultaneously with cathodic potential sweeps. The EQCM results reveal substantial differences in gravimetric behavior depending on whether the electrolyte contained Li, Na, or K cations. These variations can be explained by differences in the solvation and charge densities of the cations.

References

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