# *Supplementary Materials for:*

# Evaluation of a non-aqueous vanadium redox flow battery using a deep eutectic solvent and graphene modified carbon electrodes via electrophoretic deposition

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Cyclic voltammetry of Vacac at three different concentrations was performed with the IL in order to determine how its electrochemical activity changes with increasing or decreasing concentrations (Figure S1). The best electrochemistry is obtained for the lowest concentration of 0.01 M, which is not suitable for practical battery applications. However, this result could be of benefit for other electrochemical studies with this IL (e.g., bio-electrochemical investigations), especially when using 10 mM or lower concentrations of active species (not necessarily restricted to Vacac). Hence this result is included in this investigation.

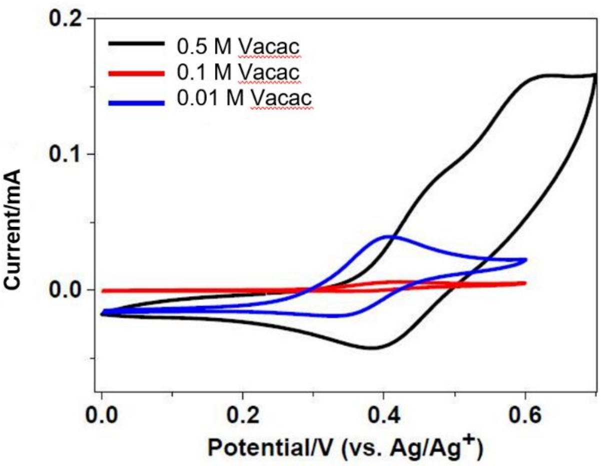


**Figure S1**. CVs (second scan) at GC electrode of $V(acac)_3$ in the IL at several different concentrations. At ten times less concentration, the CV improved significantly but this concentration was not deemed suitable for our investigation in terms of a practical battery application.

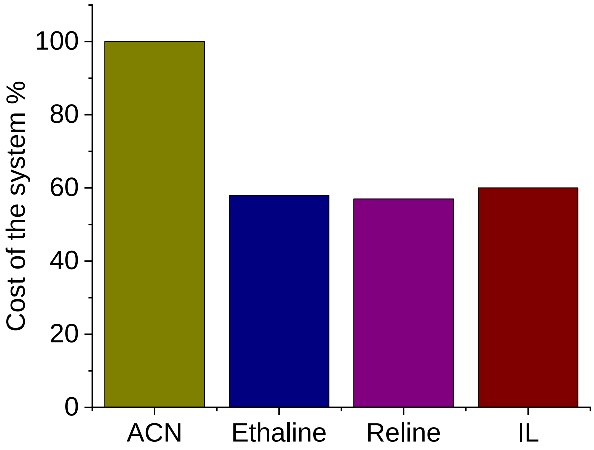


**Figure S2**. Relative costs (CAPEX) of electrolytes for application as solvents for a non-aqueous vanadium redox flow battery. Assumptions for this calculation are: 8 h of storage, 100 mW $cm^{-2}$ power density, 2 V average operational voltage, 50 mA $cm^{-2}$ current density and 0.5 M concentrated V active ions. Source of data for each solvent (along with prices from Table 1 and their respective suppliers): ACN [1], Ethaline [2], Reline [3] and IL [4].

## References


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