Supporting Information

Solving ZIB Challenges: The Dynamic Role of Water in Deep Eutectic Solvents electrolyte

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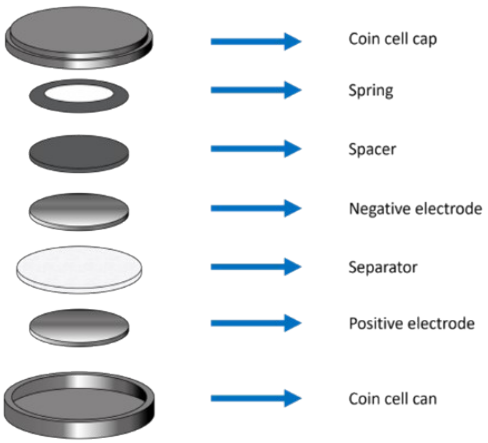

Fig. S1 – Schematic of coin-cell structure and assembly.

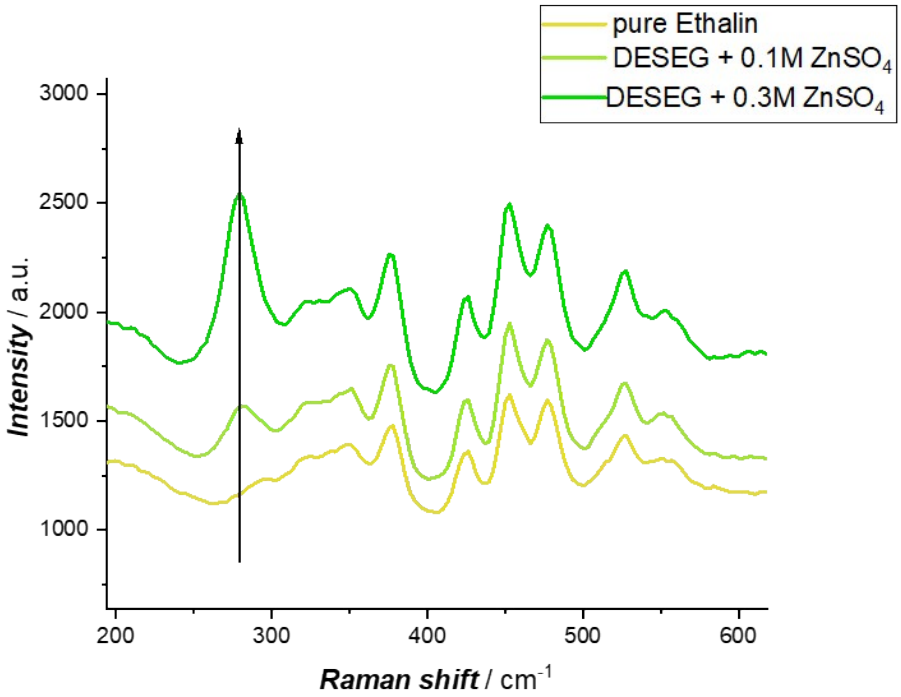

Fig. S2 - Spontaneous Raman spectra of pure anhydrous ethaline, 0.1 M and 0.3 M $ZnSO_4$ DESEG electrolytes.

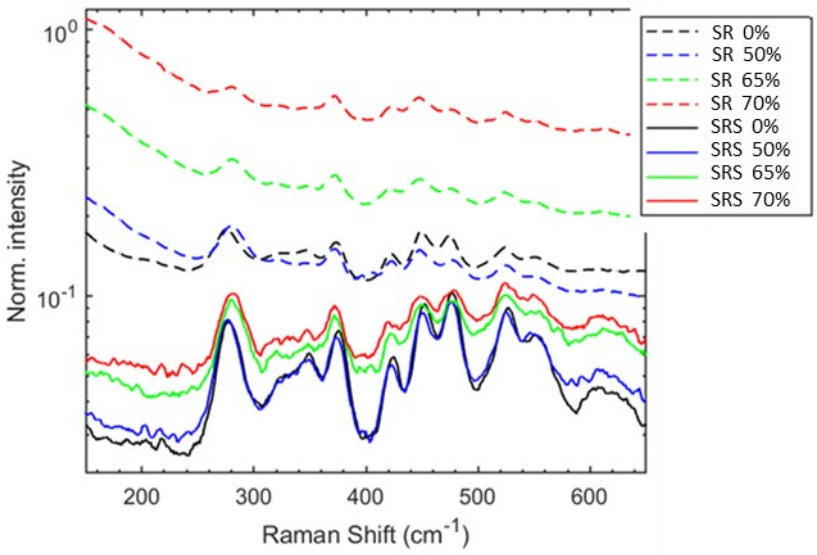

Fig. S3 - Spontaneous Raman spectra (dot lines) and SRS (solid lines) of DESEG with different hydration levels. A logarithmic y-scale has been used for improved clarity.

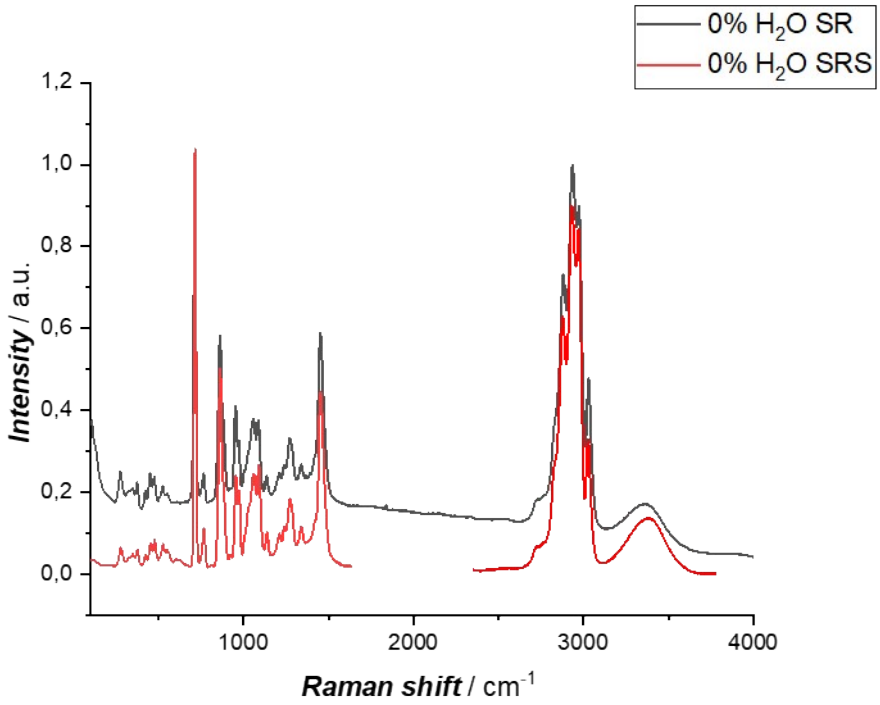

Fig. S4 - Spontaneous Raman spectra (black line) and SRS (red line) of anhydrous DESEG.

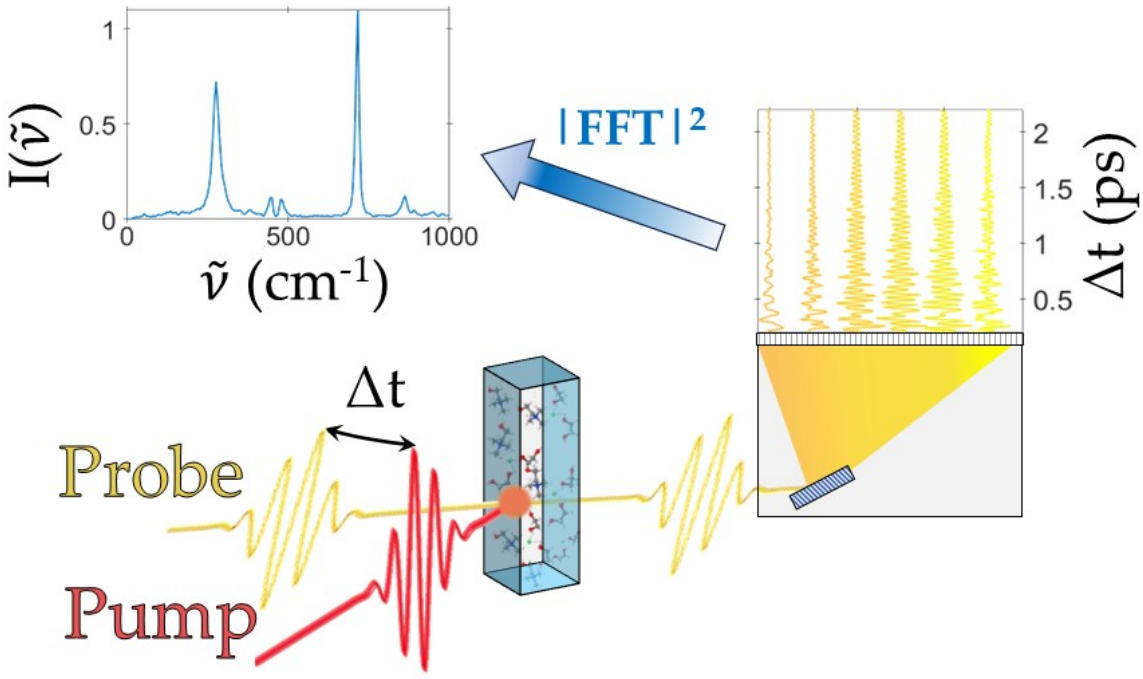

Fig. S5 –Sketch of the Impulsive Stimulated Raman spectroscopy (IVS) experimental concept: two pulses are exploited to stimulate and read out vibrational excitations directly in the time-domain, as a function of the pulse delay (Δt). Fast Fourier Transforming (FFT) over Δt allows for retrieving the vibrational response in the frequency-domain.

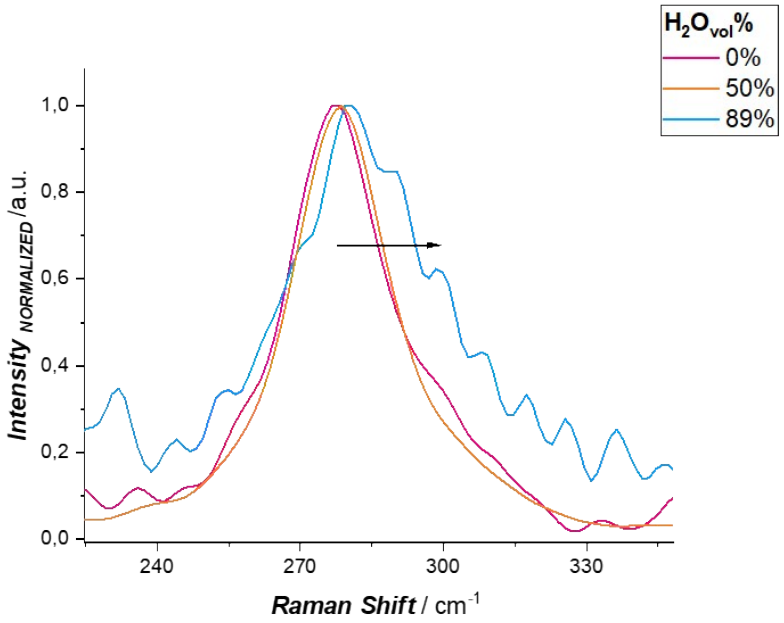

Fig. S6 ISRS spectra normalized to the intensity of the Zn-Cl peak

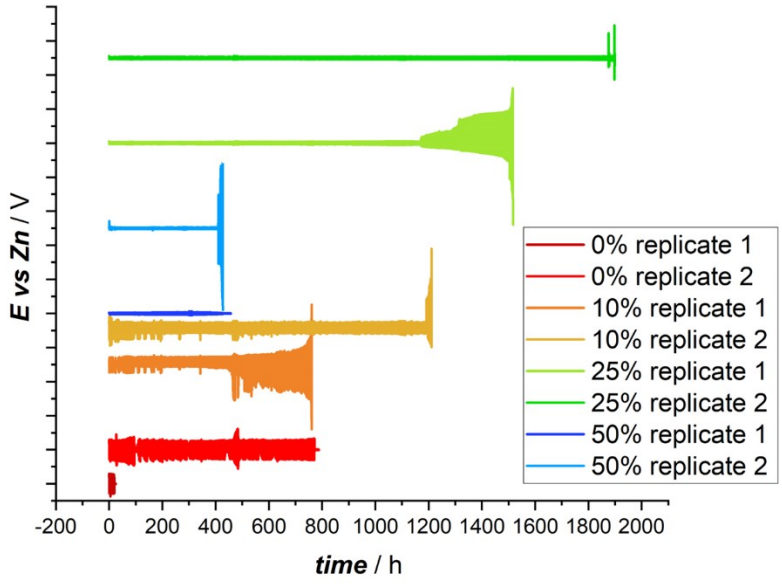

Fig. S7 - Galvanostatic charge-discharge cycling experiments replicates carried out with Zn symmetric CR2032 coin cells DESEG with different hydration levels.