## **Supporting Information**

**Electrokinetic Phenomena in Organic Solvents** 

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**Figure S1**. Current-voltage curves of a 700 nm in diameter pore in aqueous 1 M KCI. The recordings were done for an as prepared pore and after all measurements in propylene carbonate and acetone had been completed. This is the pore that is shown in the main manuscript.

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**Figure S2**. (a) Current-voltage curves of a single PET pore placed in contact with an aqueous solution of 100 mM KCl on one side, and 100 mM KCl solution in water/methanol mixtures on the other side. (b) Rectification degree calculated as a ratio of currents at +1V and -1V together with the ratio of conductivities: conductivity of the aqueous solution and of the water/methanol mixtures. The pore had a diameter of 400 nm.



**Figure S3.** Simulated current-voltage curves of a 700 nm in diameter and 11  $\mu$ m in length cylindrical pore for LiClO<sub>4</sub> concentration gradient of  $C_{high}/C_{low}$ =100 mM/1 mM. The density of surface charges depends on lithium ions concentration according to case I, described in Table 1.



**Figure S4.** Axial variation of surface charge density of the pore wall  $\sigma_w$  at three levels of applied voltage for surface charge density described as case II (see Table 1 and Figure 6). (a)  $C_{high}$ =100 mM and  $C_{low}$ =10 mM; (b)  $C_{high}$ =10 mM and  $C_{low}$ =1 mM.



**Figure S5.** Profiles of total ionic concentration in a pore for three magnitudes of applied voltage for surface charge density described as case II (Table 1 and Figure 6). Left column:  $C_{high}$ =100 mM and  $C_{low}$ =10 mM; right column:  $C_{high}$ =10 mM and  $C_{low}$ =1 mM.