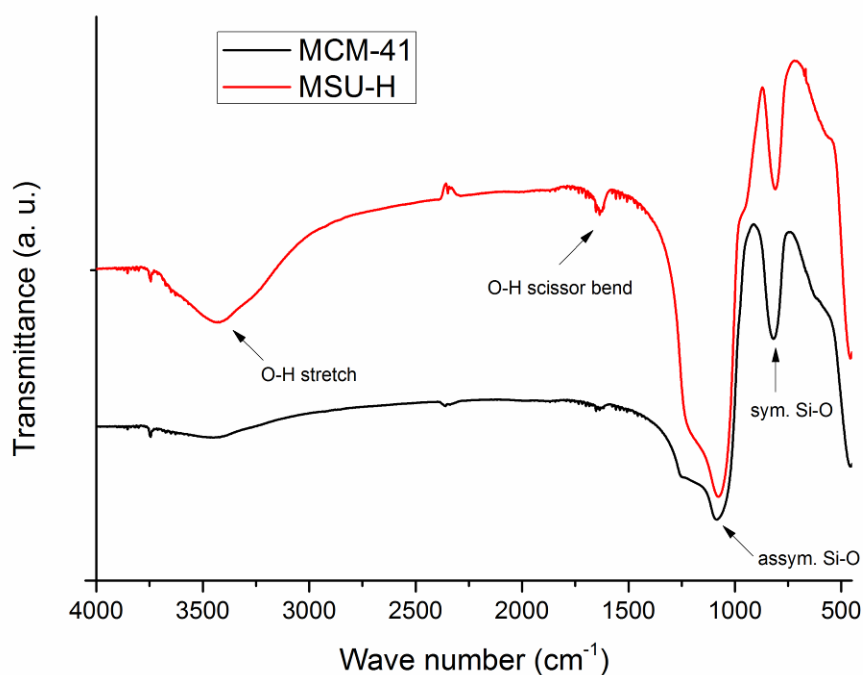
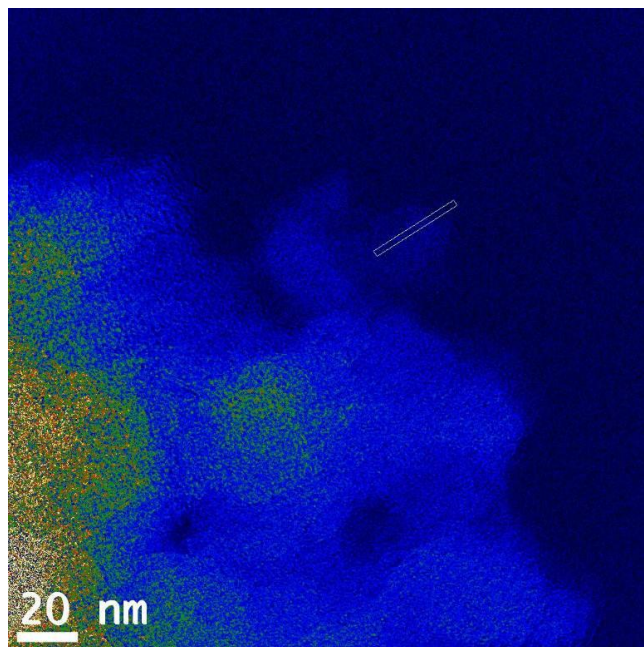


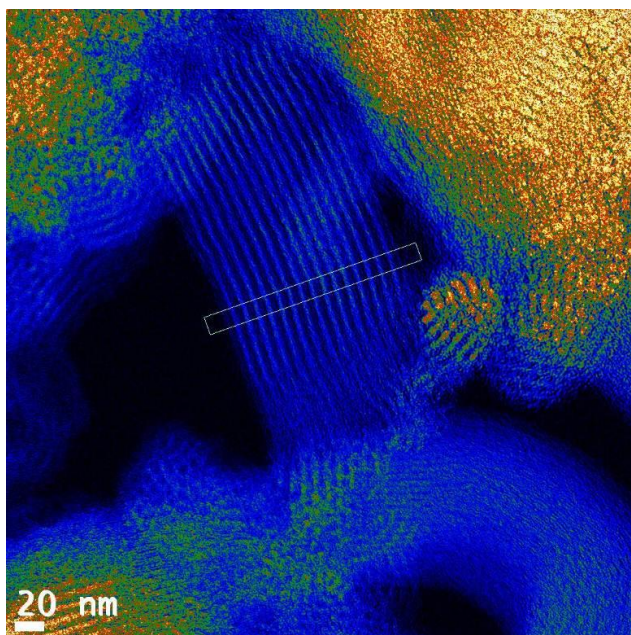
Supplementary information:



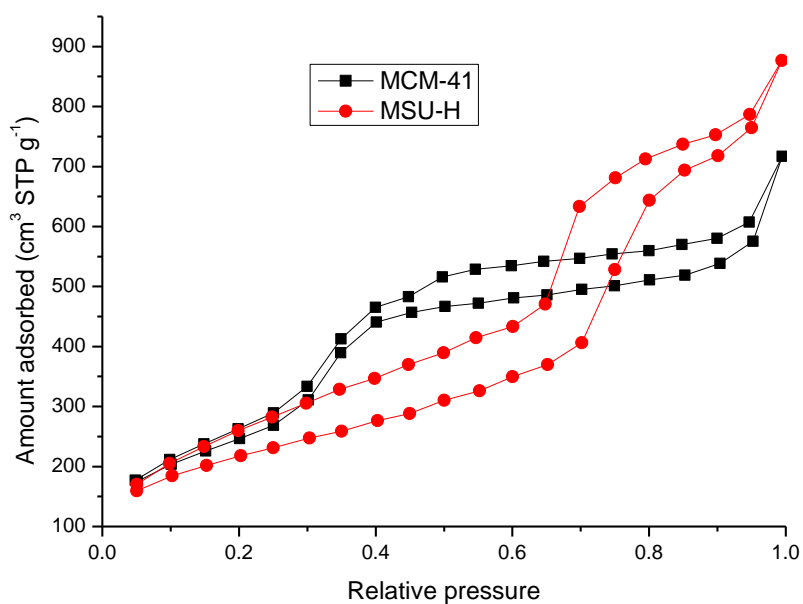
**Figure S1:** Infrared spectra of MCM-41 and MSU-H.



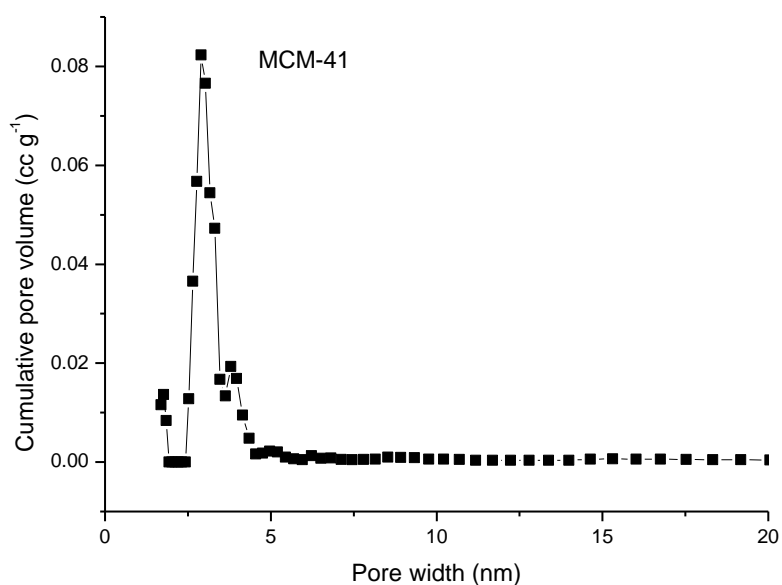
**Figure S2:** Thickness map with the chosen section for the depth profile shown in Fig. 2c (MCM-41). Thickness maps were obtained by acquiring unfiltered and zero-loss filtered images, where only elastically scattered electrons with no energy loss contribute to the second one. The logarithm of the ratio of these images is displayed which is a measure of the specimen thickness.



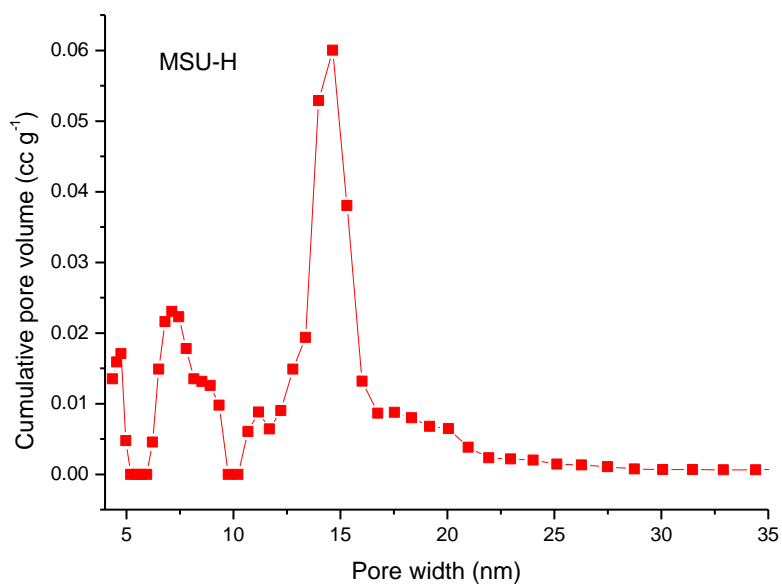
**Figure S3:** Thickness map with the chosen section for the depth profile shown in Fig. 3c (MSU-H). Thickness maps were obtained by acquiring unfiltered and zero-loss filtered images, where only elastically scattered electrons with no energy loss contribute to the second one. The logarithm of the ratio of these images is displayed which is a measure of the specimen thickness.



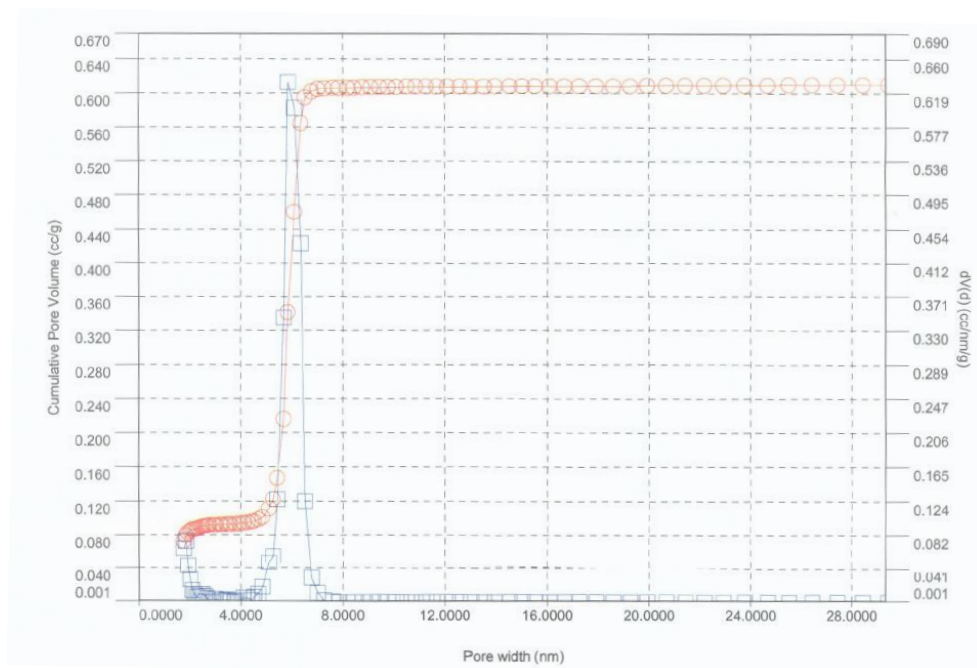
**Figure S4:** BET isotherms of MCM-41 and MSU-H.



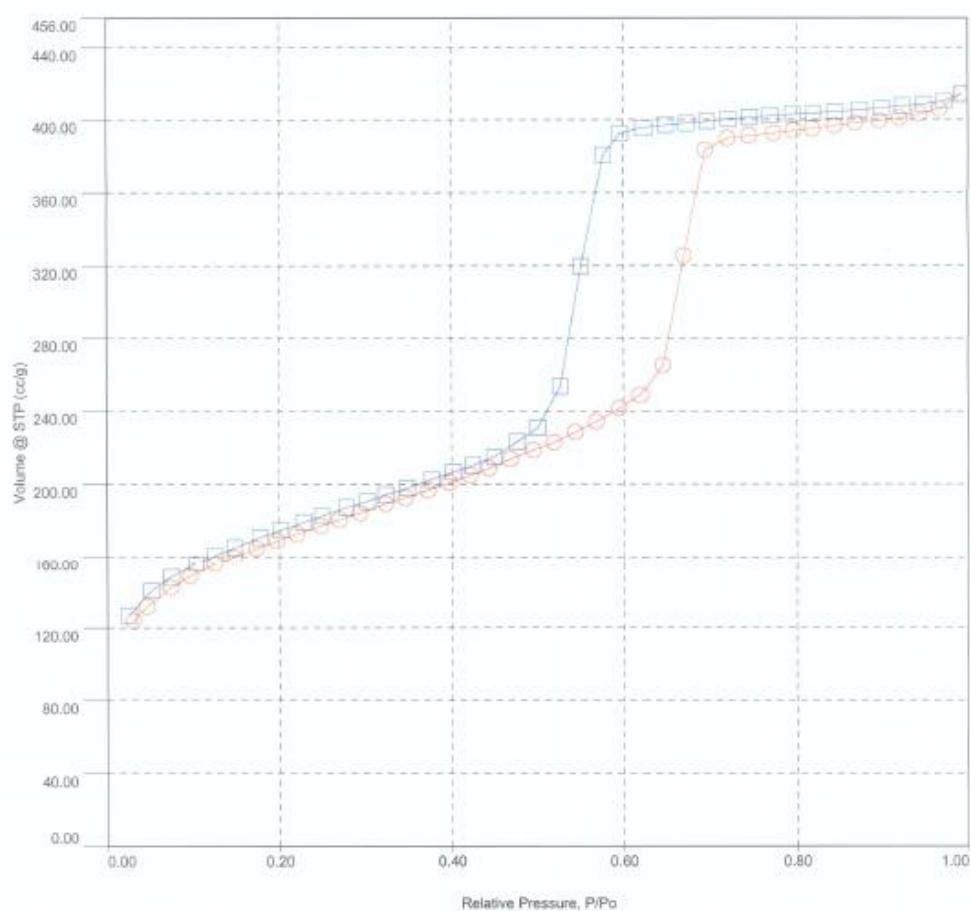
**Figure S5:** Pore size distribution of MCM-41 obtained from the DFT analysis of the nitrogen adsorption isotherm.



**Figure S6:** Pore size distribution of MSU-H obtained from the DFT analysis of the nitrogen adsorption isotherm.



**Figure S7:** Cumulative pore volume of B-PMO obtained from the DFT analysis of N<sub>2</sub> at room temperature. Red curve: volume, blue curve: derivative.



**Figure S8:** BET isotherms of B-PMO. Red curve: adsorption, blue curve: desorption.

| Sample   | $t_{m+}$    |
|--|-------------|
| 1 M LiOTf / PEG-150  | <b>0.27</b> |
| 1 M LiOTf / PEG-150 / SiO <sub>2</sub> 7 nm fumed ( $\varphi = 3\%$ )  | <b>0.52</b> |
| 1 M LiOTf / PEG-150 / SiO <sub>2</sub> 7 nm fumed ( $\varphi = 5\%$ )  | <b>0.37</b> |
| 1 M LiOTf / PEG-150 / SiO <sub>2</sub> 7 nm fumed ( $\varphi = 10\%$ ) | <b>0.46</b> |
| 1 M LiOTf / PEG-150 / SiO <sub>2</sub> 7 nm fumed ( $\varphi = 12\%$ ) | <b>0.48</b> |

**Table S1:** Lithium transference numbers of soggy sand electrolytes containing large volume fractions of fumed silica.