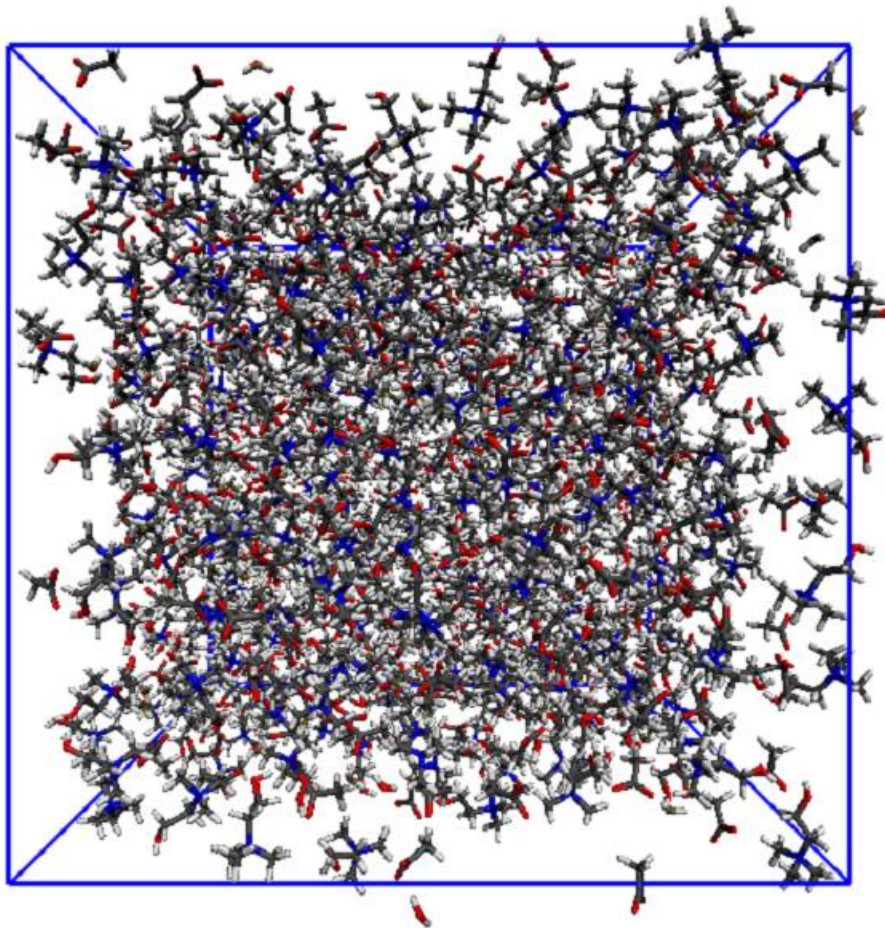
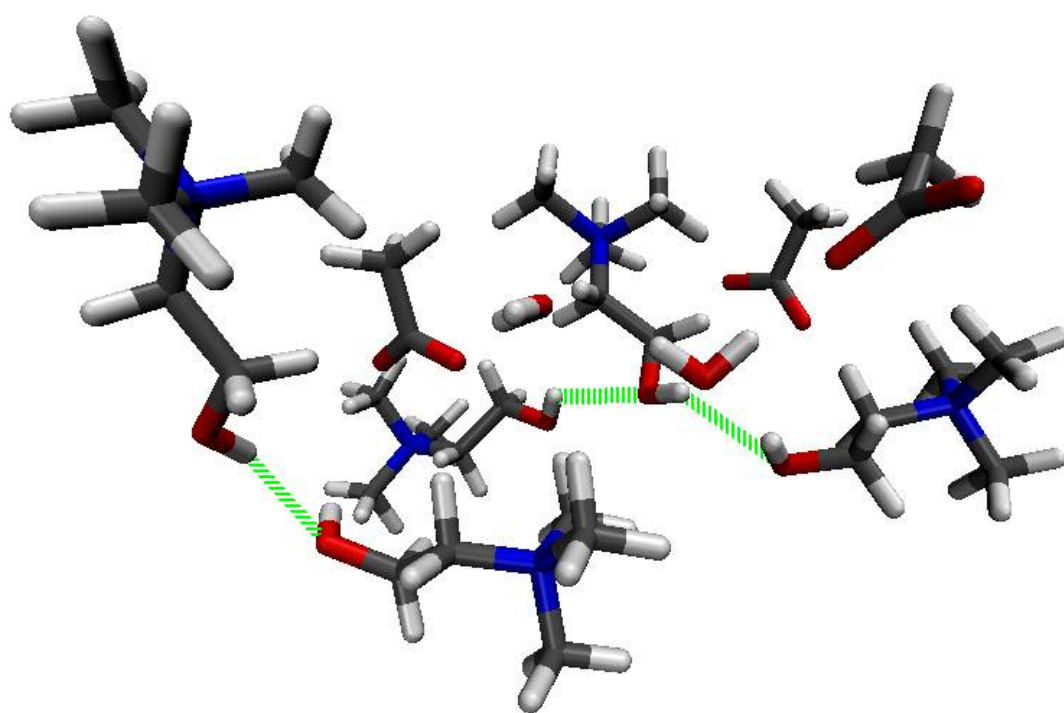


## Appendix. Supplementary Information

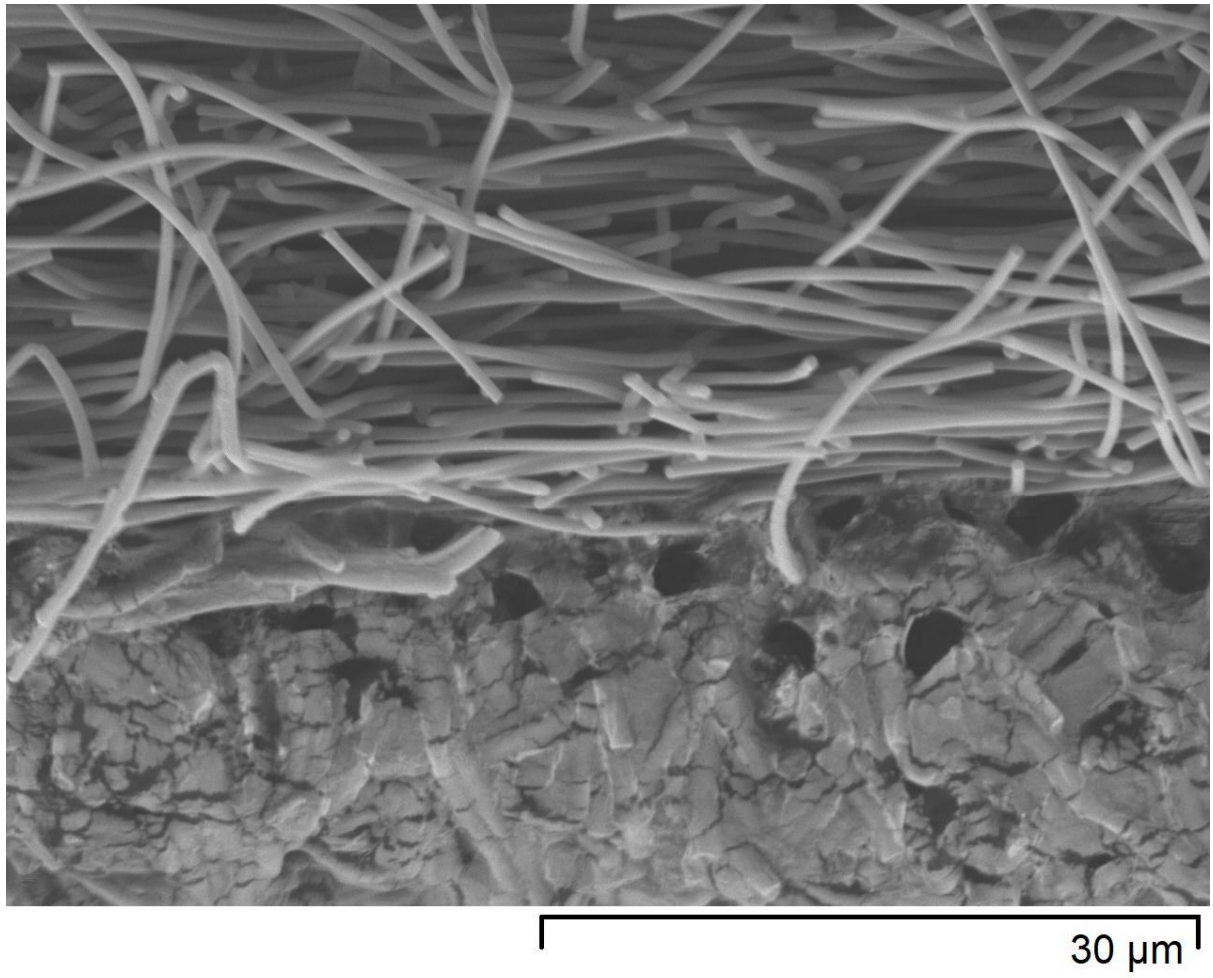
These are the supplementary materials for *Understanding the behavior of fully non-toxic polypyrrole-gelatin and polypyrrole-PVdF soft actuators with choline ionic liquids*.



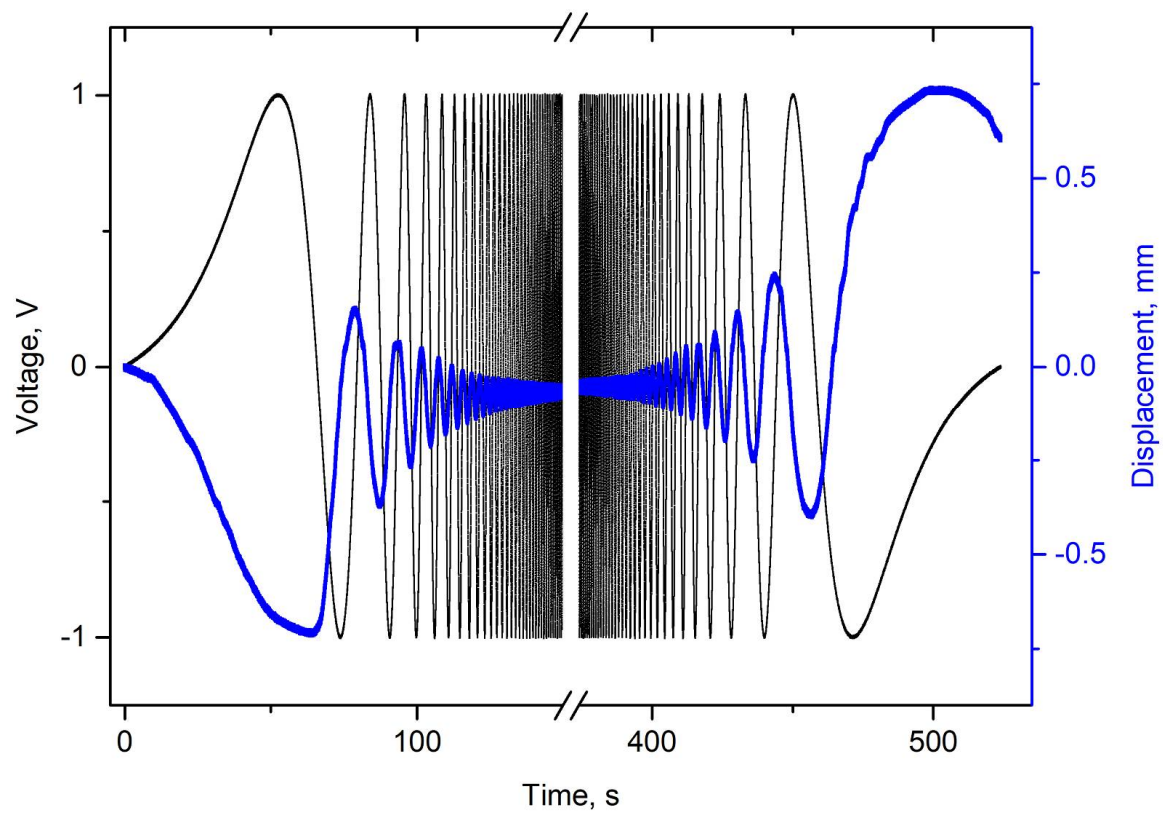
**Figure S1.** The unit cell, which contains 400 [Ch][Ac] ion pairs and 207 water molecules (to reproduce the mass content of water - 5.4%). Isometric periodic boundary conditions were applied.



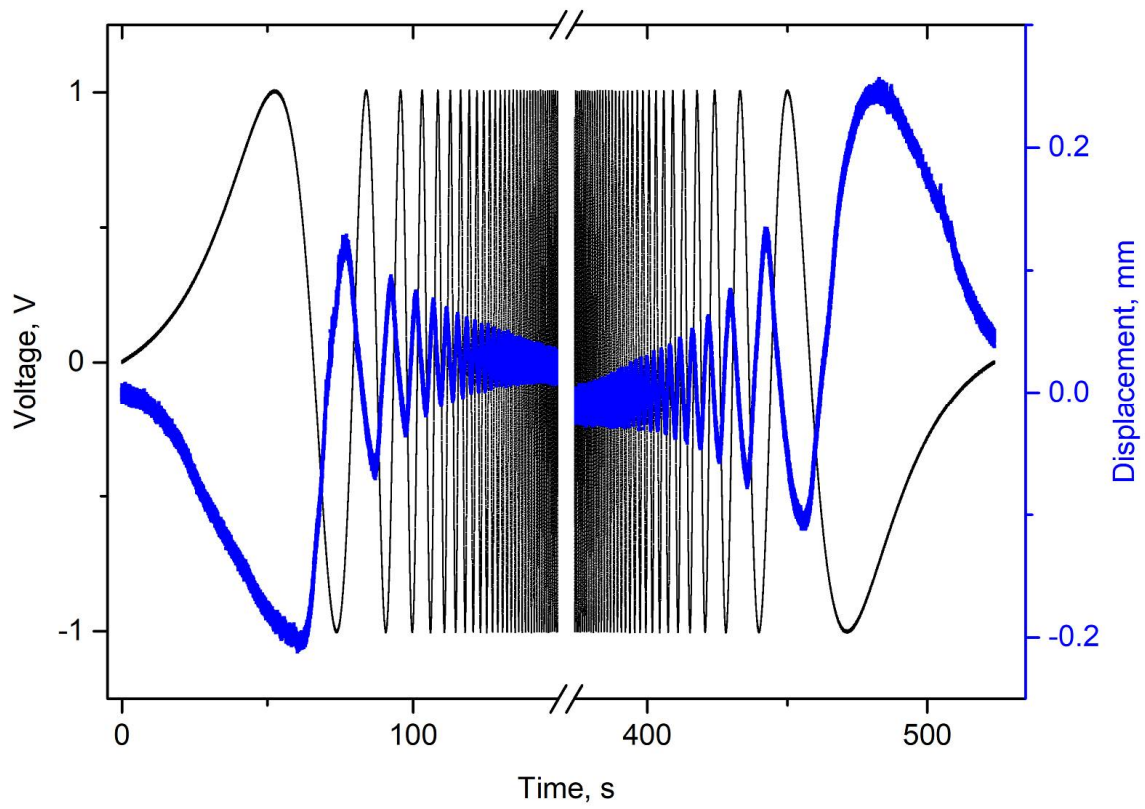
**Figure S2.** Five cations and three anions of [Ch][Ac], and two water molecules cut from the Molecular Dynamics trajectory. The H-bonds between choline cations are depicted as green.



**Figure S3.** A fusion of partially dried fibers in the gelatin membrane



**Figure S4.** An example of a frequency response graph of PPy-gelatin-[Ch][Ib] actuator



**Figure S5.** An example of a frequency response graph of PPy-gelatin-[Ch][Mal] actuator