

Table S1: Proton conductivity and vanadium permeability of the membranes swollen with a solvent ratio in the range of 4.7-5.3 (the mass ratio of DMF to H₂O).

| DMF:H₂O | 4.7 | 4.8 | 4.9:1 | 5.0: 1 | 5.1:1 | 5.2:1 | 5.3:1 |
|---|------------|------------|--------------|---------------|--------------|--------------|--------------|
| Swelling time (hours) | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Conductivity (mS.cm ⁻¹) | 13.3 | 18.5 | 22.06 | 23.53 | 28.0 | 37.76 | 55.75 |
| Permeability (×10 ⁻⁶ cm ² min ⁻¹) | / | 1.16 | 1.22 | 1.84 | 2.47 | 3.10 | / |