

Table S1. Characteristic chemical shifts/transmittances of ATR/FT-IR spectral bands for SWCNT/PANi EB composite membranes under different numbers of flash welds (at full power).

Number of flash welds	Band I (cm ⁻¹ /%)	Band II (cm ⁻¹ /%)	Band III (cm ⁻¹ /%)	Band IV (cm ⁻¹ /%)	Band V (cm ⁻¹ /%)
0	1590/55.8	1496/46.1	1300/53.5	1165/54.4	827/48.1
1	1595/60.1	1496/30.3	1284/47.2	1167/55.6	812/44.9
2	1602/70.1	1496/31.2	1282/50.3	1171/63.0	811/47.6
3	1602/70.6	1496/31.2	1282/52.3	1171/63.9	812/48.6
4	1602/71.4	1496/34.3	1282/53.3	1171/65.2	811/50.2
5	1602/75.6	1496/43.8	1282/59.5	1171/69.6	812/55.9