Electronic Supplementary Material (ESI) for Materials Chemistry Frontiers.

Supporting Information

A reinforced ceramic-coated separator by overall-covered modification of electron-insulated polypyrrole for safety performance of lithium-ion batteries

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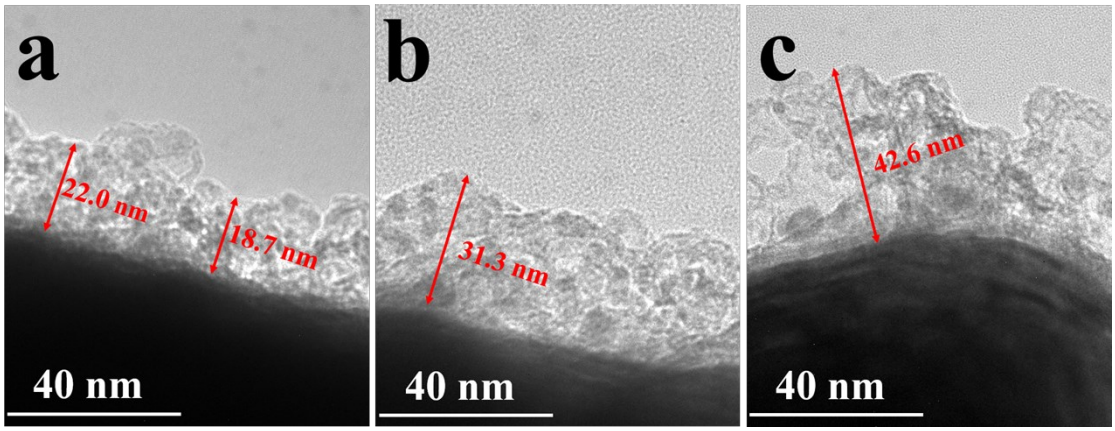

Figure S1. The TEM images of PPy modified Al_2O_3 particles prepared by (a) 7.5, (b) 10, and 20 mmol·L^{-1} Py and APS hybrid solution.

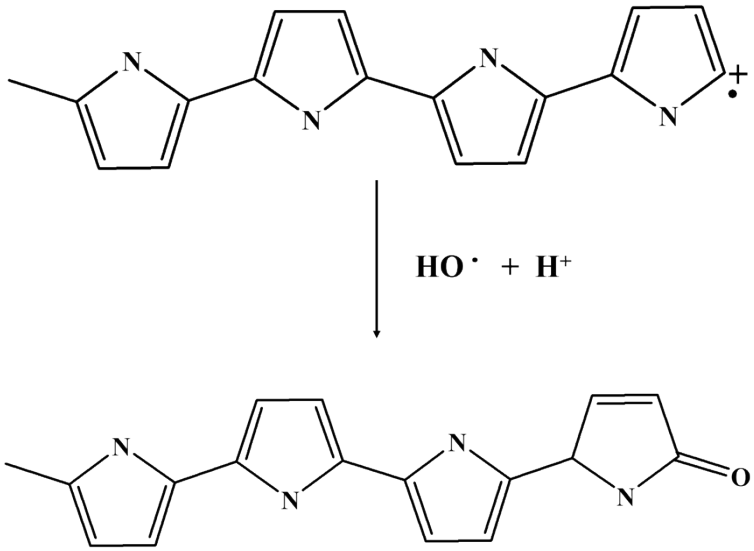

Figure S2. The degradation of PPy by OH radicals, with the subsequent formation of C=O moieties.

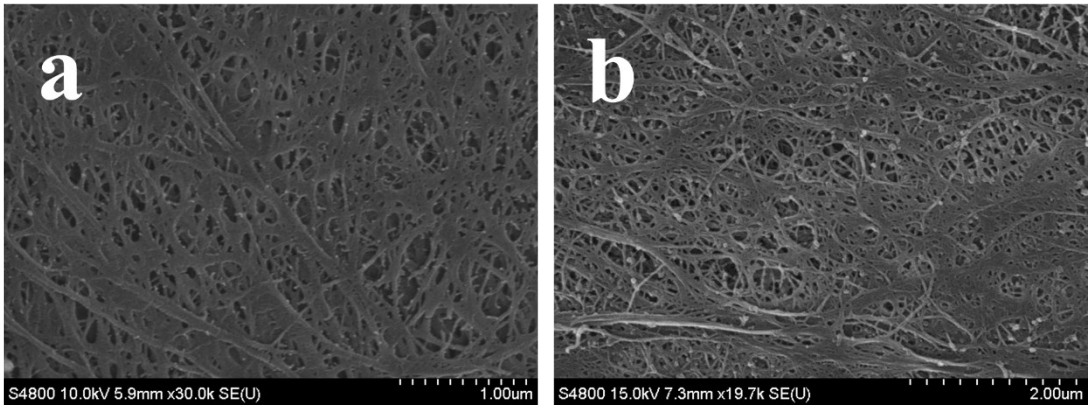

Figure S3. The SEM image of peeled CCS (a) and CCS@PPy-10 (b).

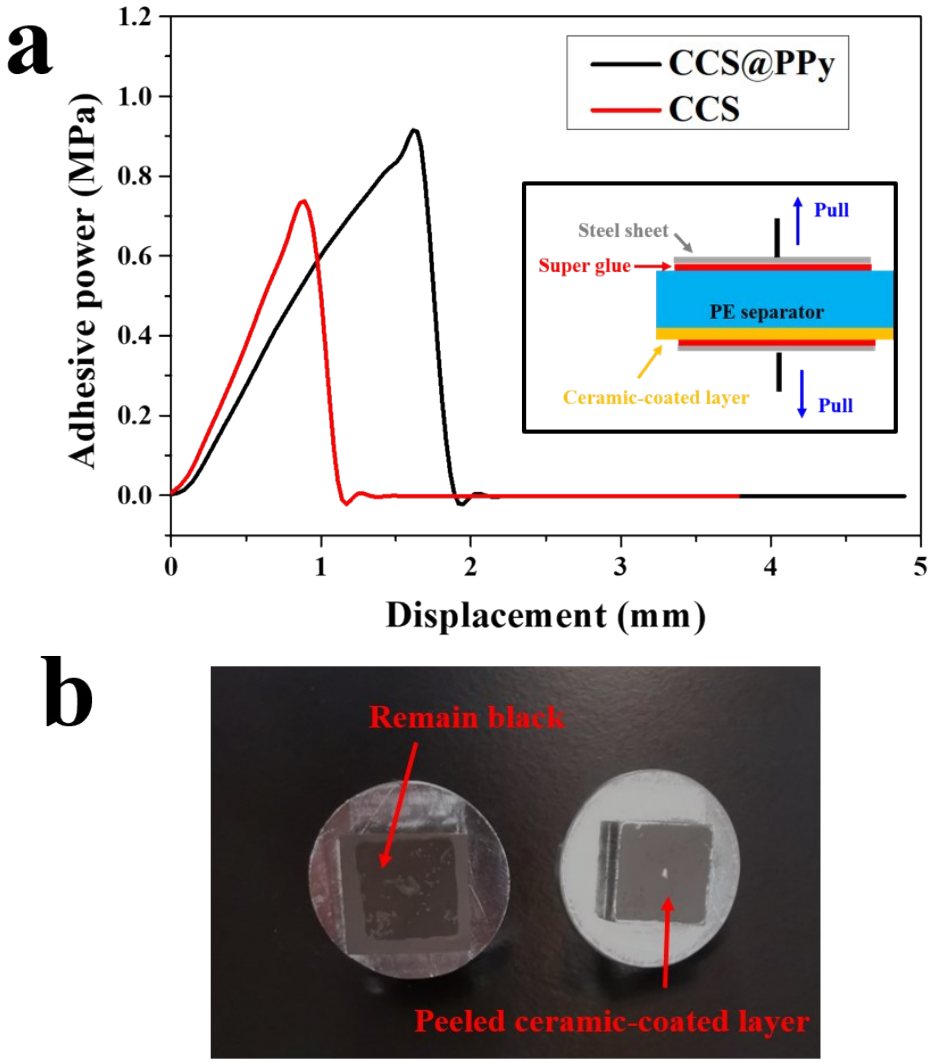

Figure S4. The result of adhesion test of CCS and CCS@PPy-10 (a) and image of CCS@PPy-10 after adhesion test (b).

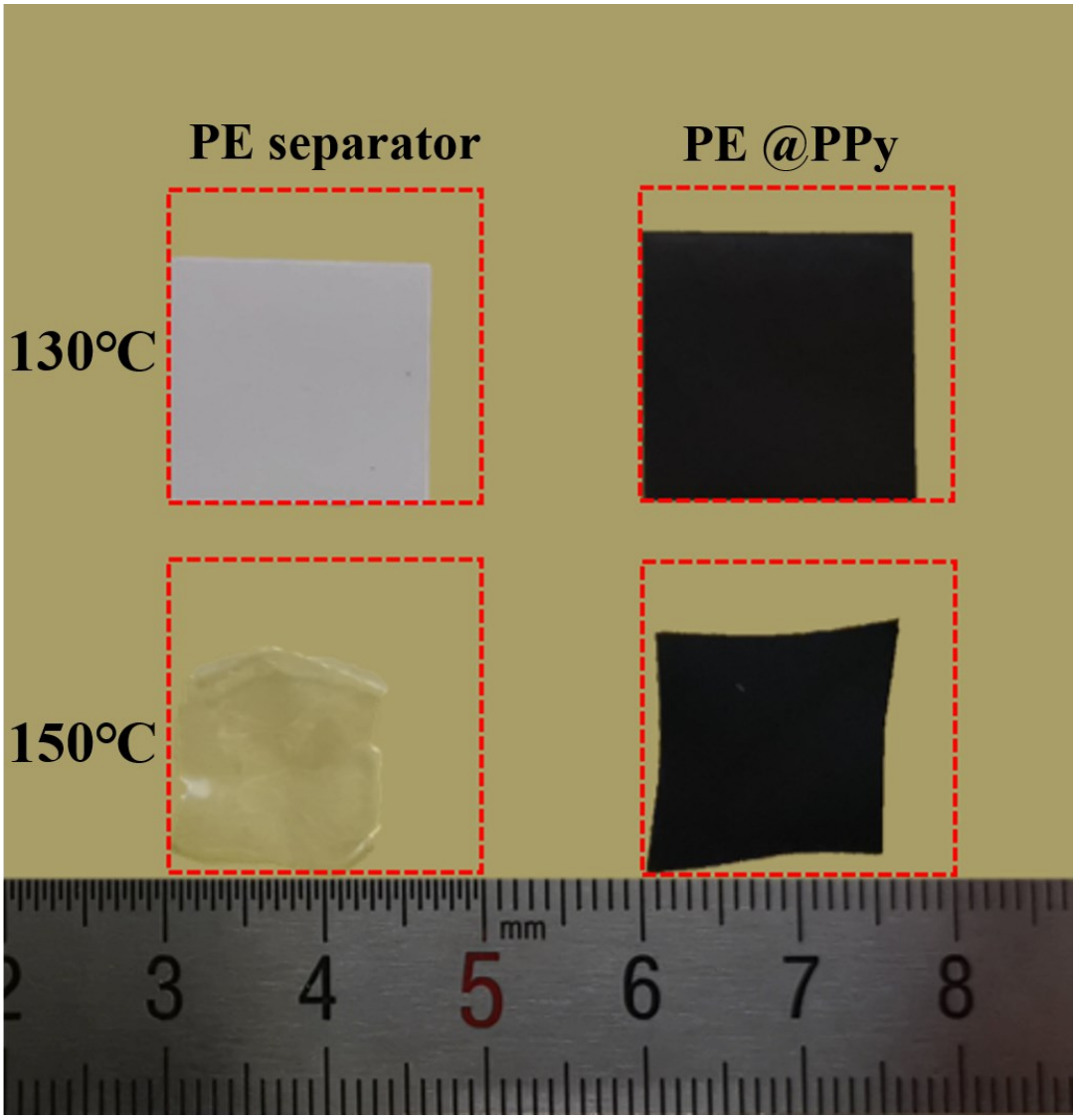

Figure S5. The thermal shrinkage tests of PE separator and PE@PPy at various temperature.

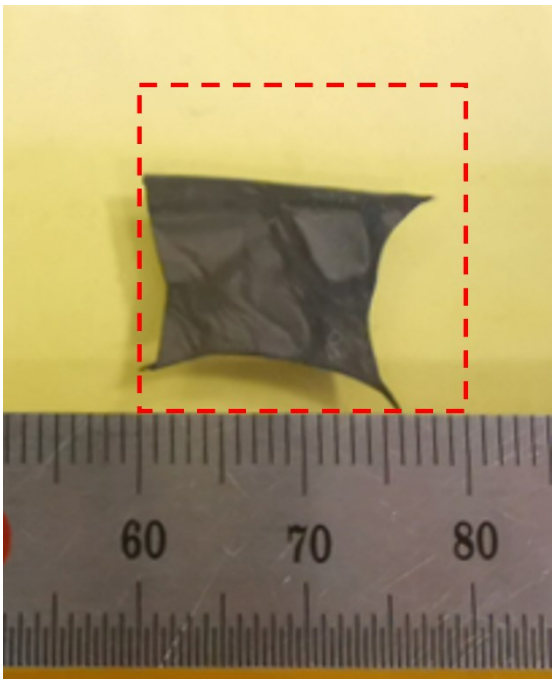

Figure S6. The photo of CCS@PPy-7.5 after heating at 200 ℃ for 30 min.

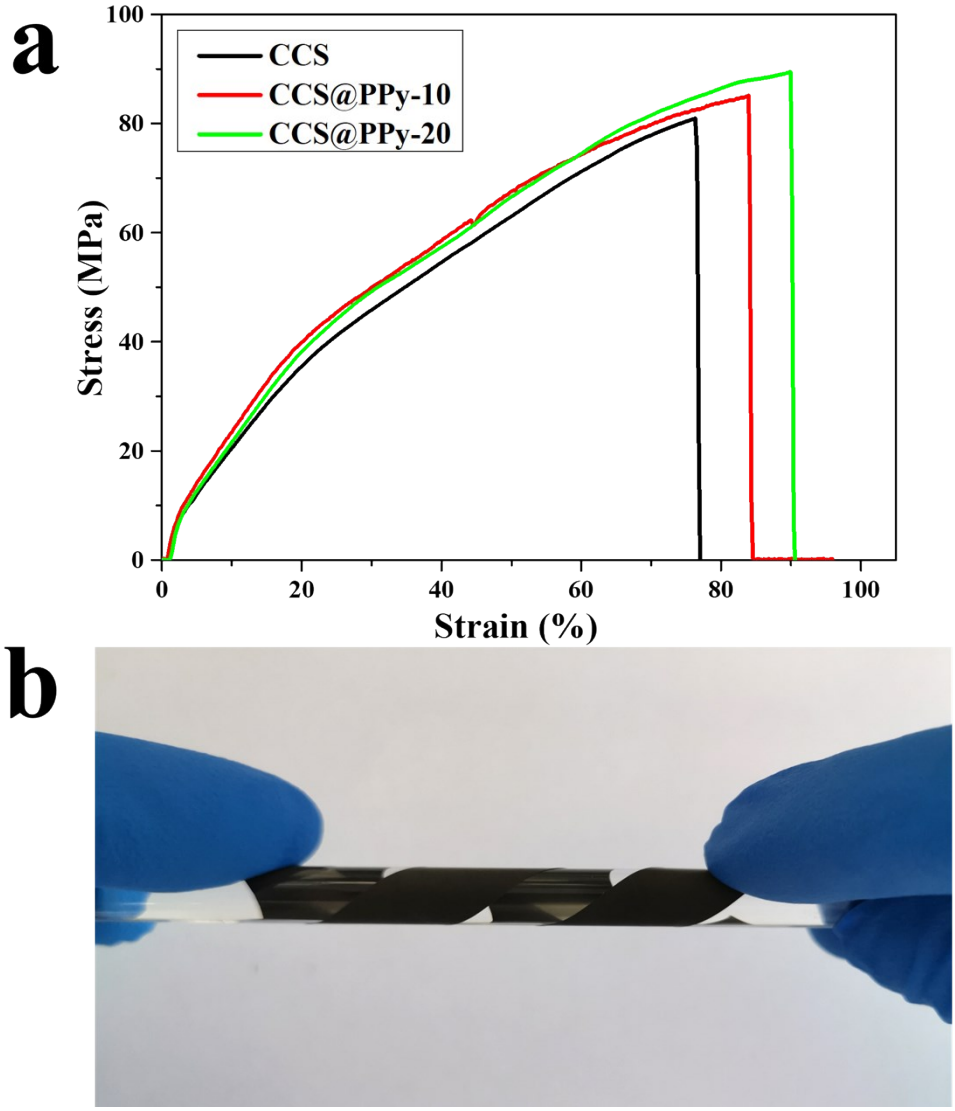

Figure S7. (a) The stress–strain curves of CCS, CCS@PPy-10, and CCS@PPy-20, (b) the photo of CCS@PPy wrapping a glass rod.

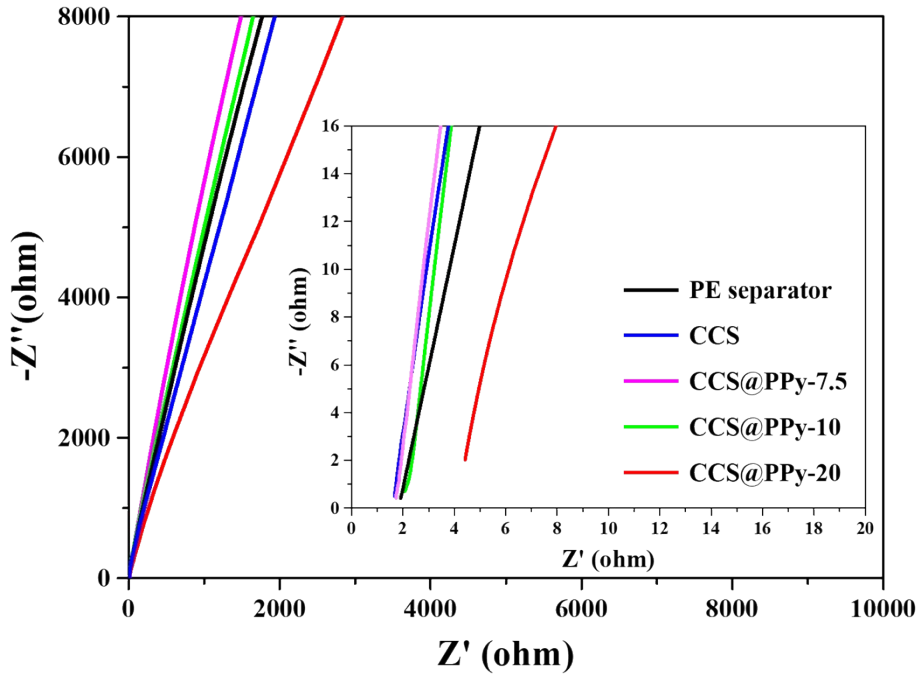

Figure S8. The electrochemical impedance spectroscopy of PE separator, CCS, CCS@PPy-7.5, CCS@PPy-10, and CCS@PPy-20.

Table S1 The result of electrical resistivity of PPy

Serial number	Thickness (μm)	Diameter (mm)	Resistance (MΩ)	Electrical resistivity (Ω·cm)
1	85	12	61.5	8.14E+9
2	96	12	70.2	8.25E+9
3	120	12	87.1	8.22E+9
Average				8.20E+9