**Supporting Information**

**Mechanically Durable, Highly Conductive and Anti-corrosive Composite Fabrics with Excellent Self-cleaning Performance for High-efficiency** **Electromagnetic Interference Shielding**

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1. Electromagnetic Interference (EMI) Shielding Measurements

The physical parameters for evaluating the EMI performance can be calculated based on the scattering parameters (*S*11 and *S*21). The relevant formulas are shown as follows:

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where *A*, *R* and *T* are the absorption, reflection and transmission coefficients, respectively. *Pout* and *Pin* are the transmitted and incident power, respectively. SEtotal, SEreflection, and SEabsorption are the total, reflective, and absorptive EMI shielding effectiveness, respectively.

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**Figure S1.** SEM images of a and b) pristine PP nonwoven fabric; c and d) PP/PDA fabric

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**Figure S2.** Magnified SEM images of Fig. 2a-2c for PP/PDA/AgNPs with different STA concentration. a) 5 wt.%, b) 12 wt.% and c) 20 wt.%. Magnified SEM images of Fig. 2d-2f for PP/PDA/AgNPs/PDMS-40 with different STA concentration. d) 5 wt.%, e) 12 wt.% and f) 20 wt.%.

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**Figure S3** The SEM images of the cross section of the silver layer covered on the (a) PP/PDA/AgNPs-5%/PDMS-40, (b) PP/PDA/AgNPs-12%/PDMS-40, (c) PP/PDA/AgNPs-25%/PDMS-40.

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**Figure S4.** XRD spectra of PP, PP/PDA, PP/PDA/AgNPs and PP/PDA/AgNPs/PDMS fabric

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**Figure S5.** TGA for PP, PP/PDA, PP/PDA/AgNPs-25% and PP/PDA/AgNPs-25%/PDMS-40

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**Figure S6.** Reflection coefficient(*R*) and absorption coefficient(*A*) at 8.2 GHz for the PP/PDA/AgNPs/PDMS-40 composite fabric prepared under different STA concentration

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**Figure S7.** Variation of the R/R0 of PP/PDA/AgNPs-25%/PDMS-40 composite fabric in a moisture environment with the humidity of 95%.

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**Figure S8.** SEM images of PP/PDA/AgNPs-25%/PDMS-40 a and a') after 50 times abrasion; b and b') after 100 times winding tests and c and c') after immersion in the acid solution (pH=1) for 20h.

**Table S1.** The sliding angle (SA) of PP/PDA/AgNPs/PDMS-40 prepared under different concentration of STA.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| STA concentration (wt.%) | 5 | 8 | 12 | 18 | 20 | 25 |
| SA(°) | **NA** | **NA** | **NA** | **NA** | **～8.0** | **～1.5** |