

## Supplemental files

# Effects of infill patterns on resistance-dependent strain and ammonia gas sensing behaviors of 3D-printed thermoplastic polyurethane modified with polypyrrole

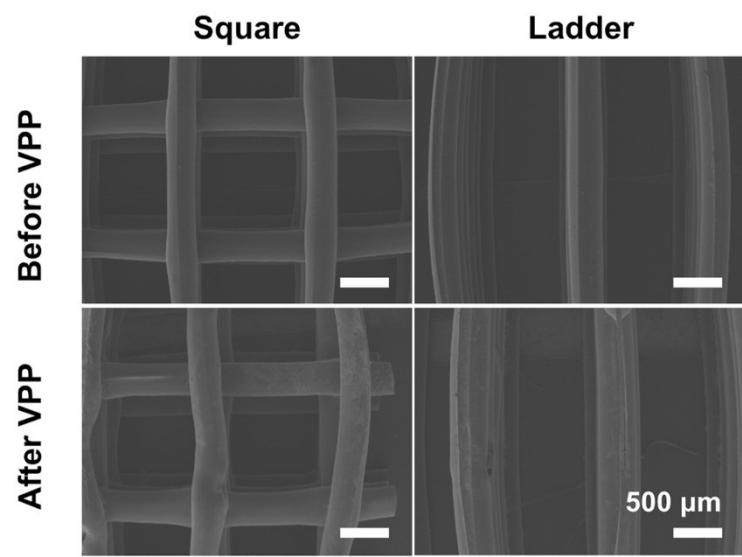
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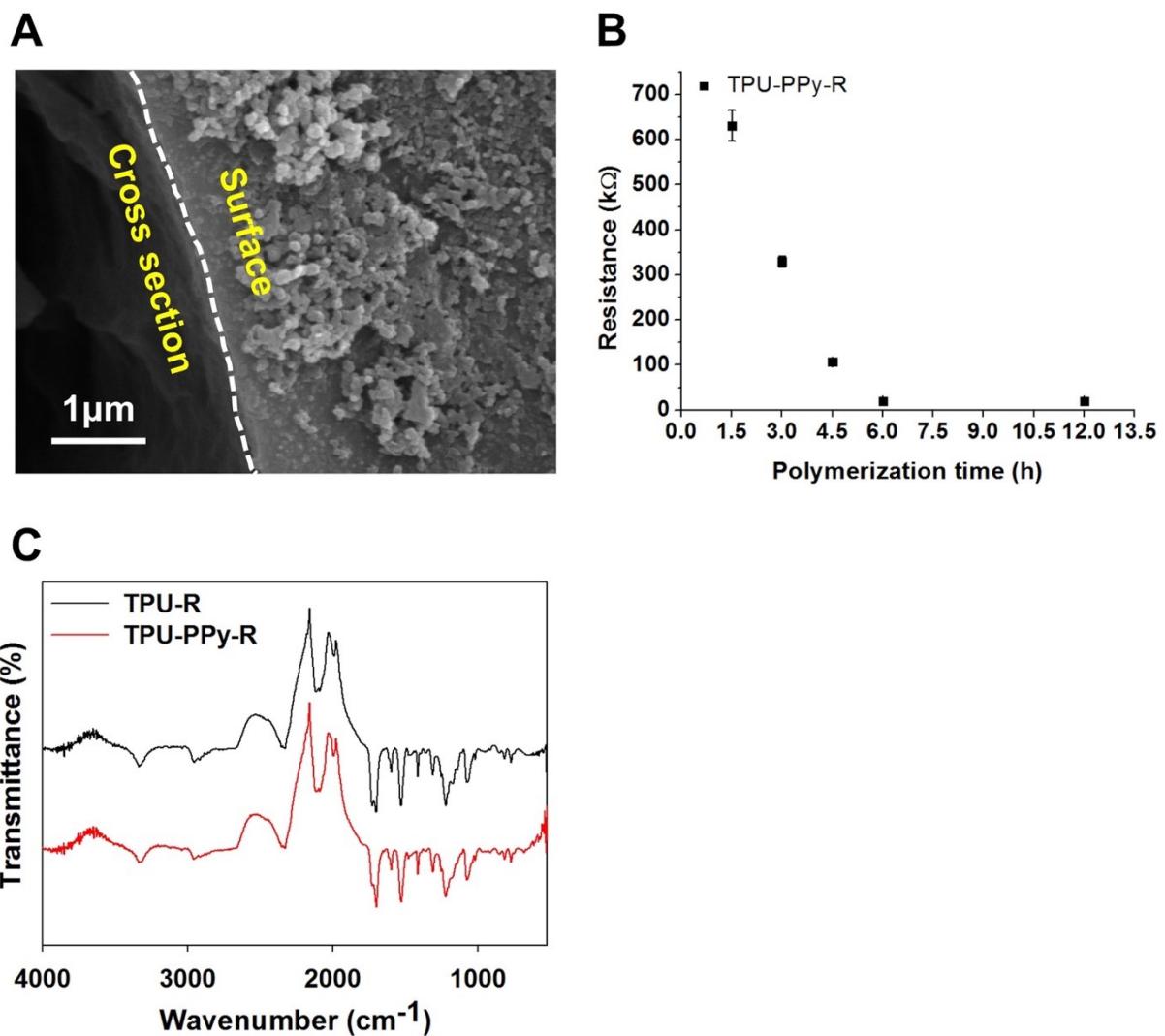
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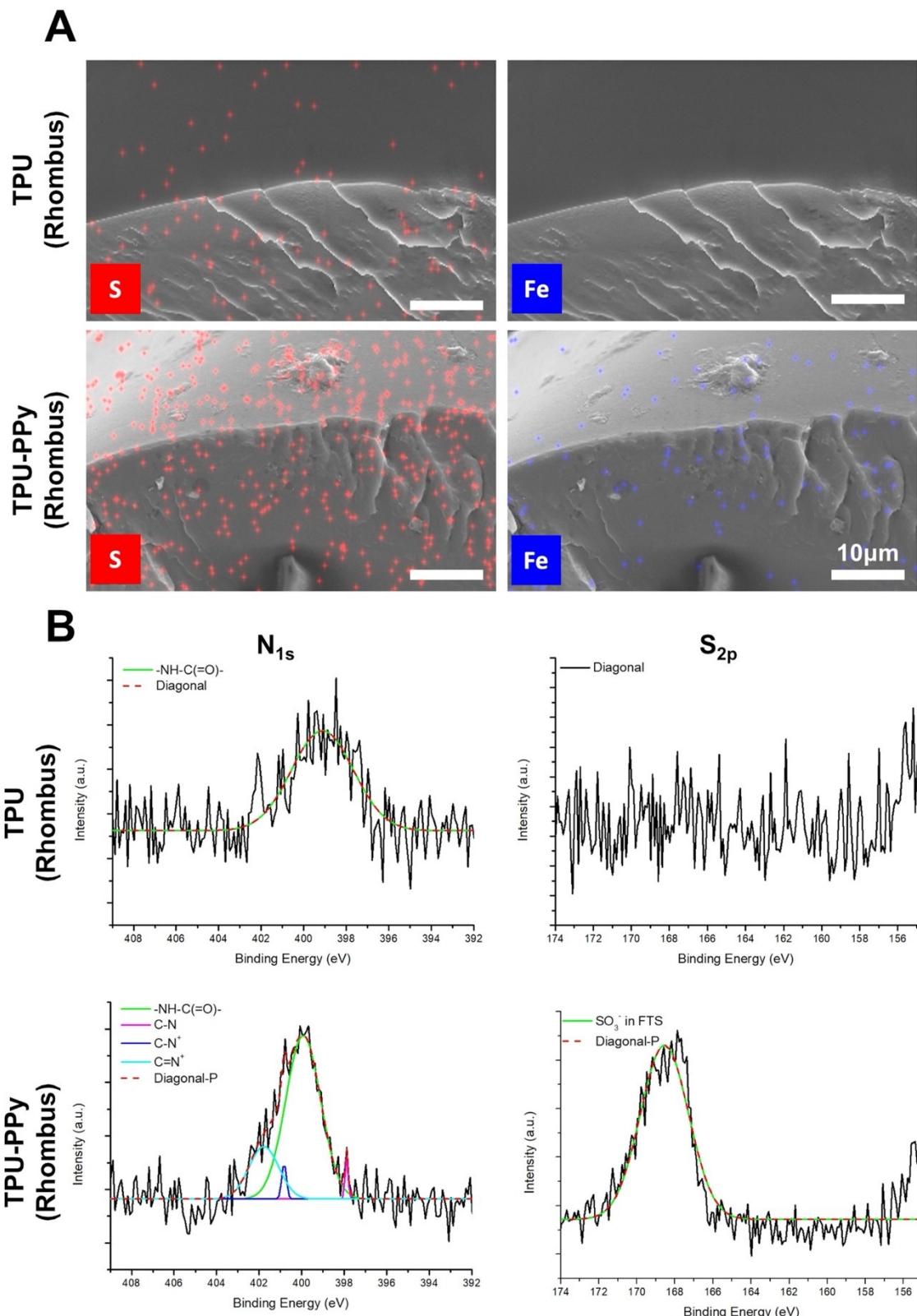
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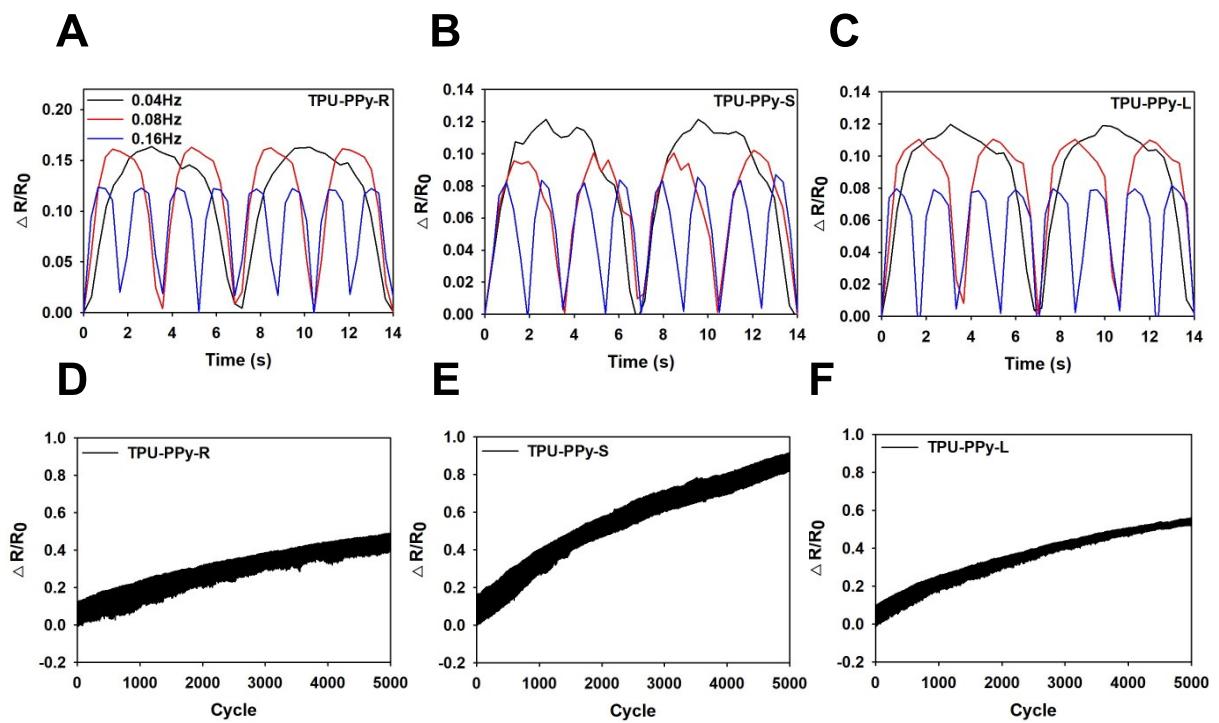
**Fig. S1** Representative SEM images of different infill patterns (square & ladder) of TPU before/after VPP with PPy.



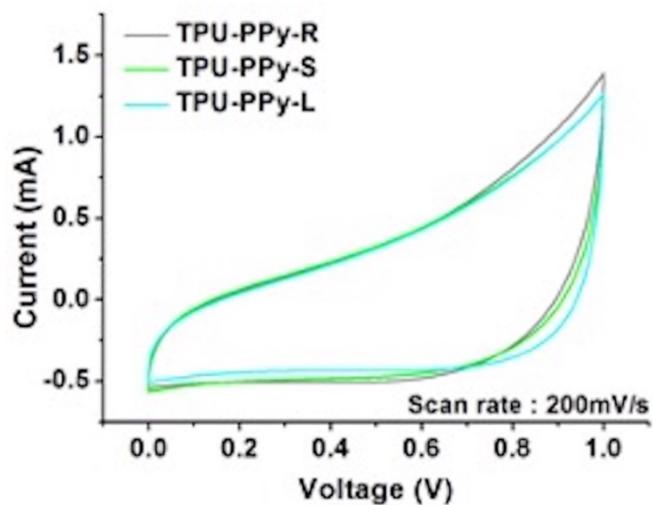
**Fig. S2** (A) representative SEM image of PPy on the TUP after VPP, (B) Resistance changes as a function of time of VPP, (C) FT-IR spectra before/after VPP



**Fig. S3** Chemical characterization of TPU, and TPU-PPy. (A) EDS elemental mapping, (B) XPS spectra.



**Fig. S4** Strain sensor behavior of TPU-PPy composites. (A-C) 10% applied strain at different strain rates, (E-F) Durability test for 5000 cycles at 10% applied strain.



**Fig. S5** I-V hysteresis with respect to different infill patterns

**Table S1. Element wt.% of rhombus infill pattern of TPU, and TPU-PPy.**

<b>Element</b>	<b>norm C (wt%)</b>	
	<b>TPU-R</b>	<b>TPU-PPy-R</b>
<b>C</b>	<b>67.57</b>	<b>71.01</b>
<b>O</b>	<b>24.1</b>	<b>20.16</b>
<b>N</b>	<b>8.13</b>	<b>7.16</b>
<b>S</b>	<b>0.21</b>	<b>1.58</b>
<b>Fe</b>	<b>0</b>	<b>0.09</b>