

Supplementary Information

Table S1. Classification for puncture resistance for hand protection against a spike and hypodermic 25G needle according to the American National Standard Institute/International Safety Equipment Association (ANSI/ISEA 105-2016) standards.

Spike Test *		Needle Test	
Level	Puncture (N)	Level	Puncture (N)
0	<10N	0	<2N
1	≥10N	1	≥2N
2	≥20N	2	≥4N
3	≥60N	3	≥6N
4	≥100N	4	≥8N
5	≥150N	5	≥10N

Note: * The European standard for protective gloves against mechanical risks (EN 388:2016 standard) has a 4-level classification for spike penetration ($20 \leq \text{Level-1} < 60$, $60 \leq \text{Level-2} < 100$, $100 \leq \text{Level-3} < 150$, $\text{Level-4} \geq 150$ N).

Table S2. Absolute and normalized penetration resistance force of plasma-treated neat and coated UHMWPE fabrics against a spike.

No. of Stacked Fabric Layers	Particle Loading in PU Mixture (wt.%)	Maximum Penetration Force (N)	Normalized Penetration Force ($\text{N}/(\text{g}/\text{m}^2) \times 10^{-3}$)	Protection Level (ANSI/ISEA 105-2016)
1	Neat (no coating)	33.2 ± 9.0	144.3	2
	0 (only PU)	45.7 ± 4.5	135.2	2
	30	67.3 ± 8.3	186.9	3
	50	105.7 ± 9.7	127.0	4
7	Neat (no coating)	181 ± 14.7	112.4	5
5	0 (only PU)	217.2 ± 29.0	128.5	5
	30	284.1 ± 7.2	157.8	5
	50	208.4 ± 15.7	125.2	5

Table S3. Absolute and normalized penetration resistance force of plasma-treated neat and coated UHMWPE fabrics against a 25 G hypodermic needle.

No. of Stacked Fabric Layers	Particle Loading in PU Mixture (wt.%)	Maximum Penetration Force (N)	Normalized Penetration Force ($\text{N}/(\text{g}/\text{m}^2) \times 10^{-3}$)	Protection Level (ANSI/ISEA 105-2016)
1	Neat (no coating)	0.65 ± 0.26	2.83	0
	0 (only PU)	1.35 ± 0.37	4.00	0
	30	1.65 ± 0.41	4.58	0
	50	2.14 ± 0.46	2.57	1
7	Neat (no coating)	1.04 ± 0.13	0.64	0
5	0 (only PU)	4.18 ± 0.36	2.47	2
	30	4.63 ± 0.56	2.57	2
	50			
2		3.77 ± 0.40	2.26	1

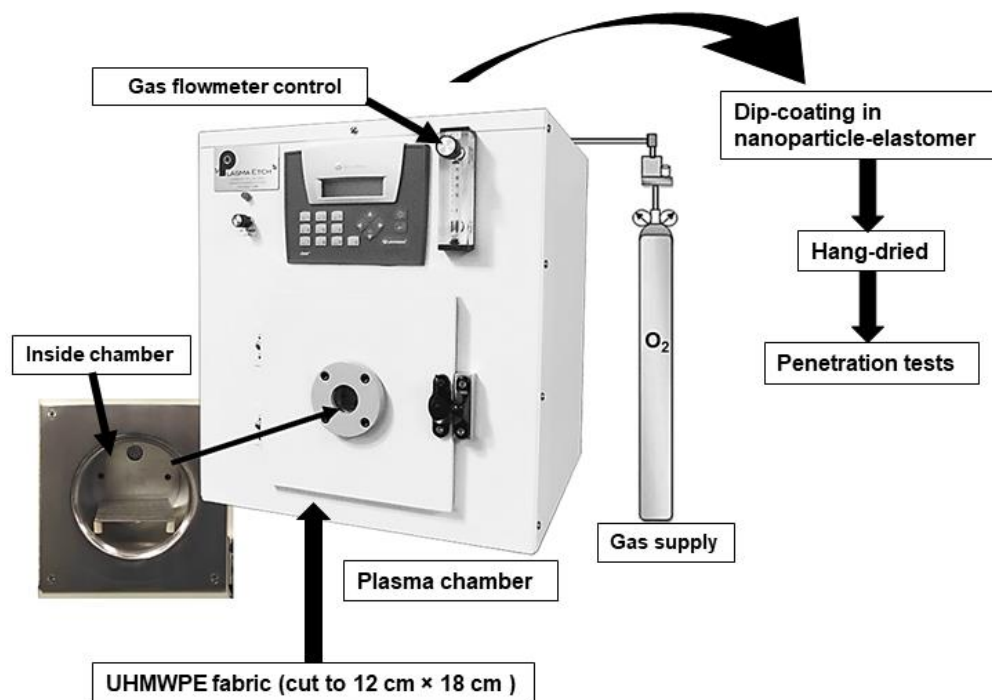


Figure S1. The schematic of fabrication process and plasma treatment setup.



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