

FIG. 1

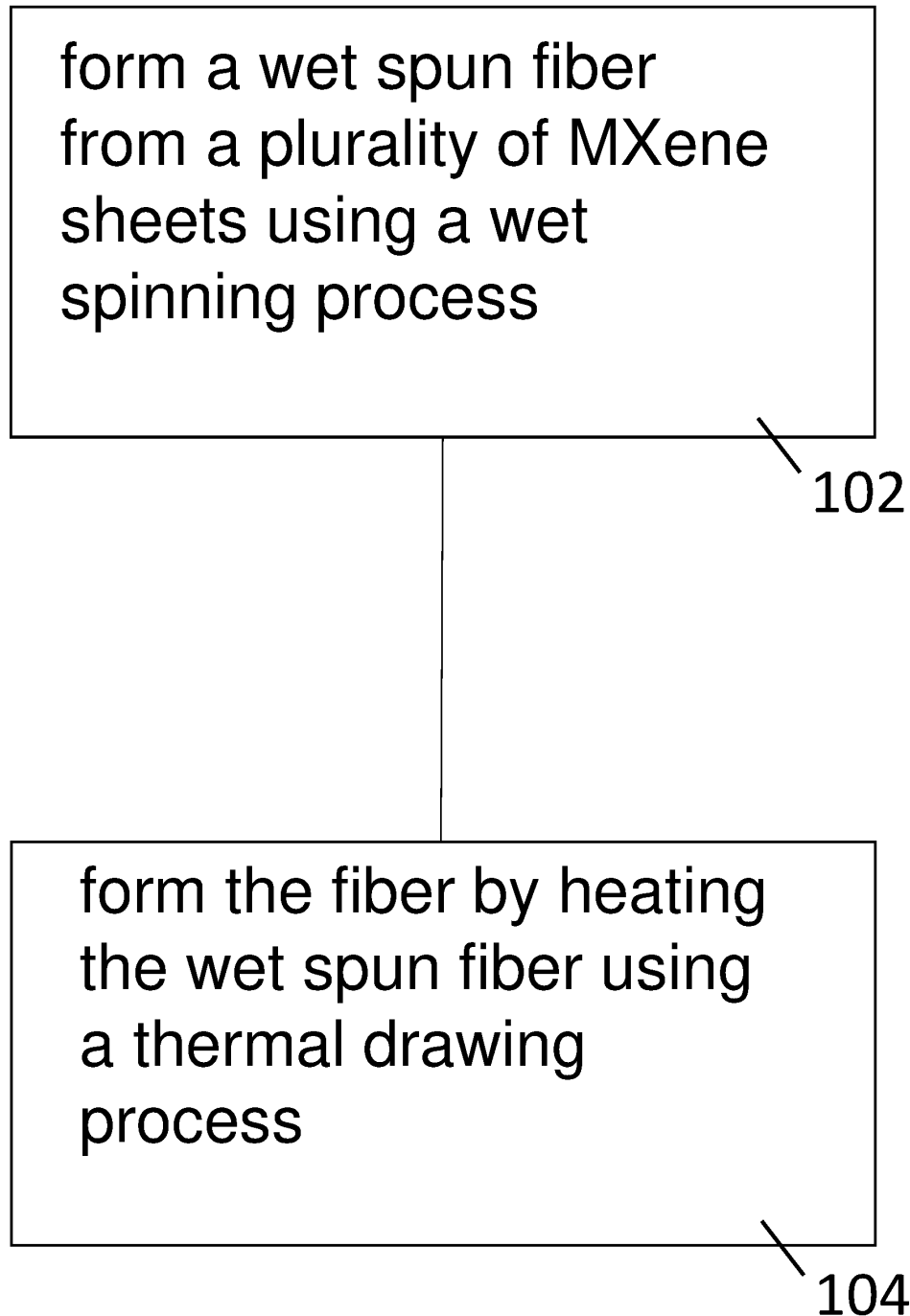


FIG. 2

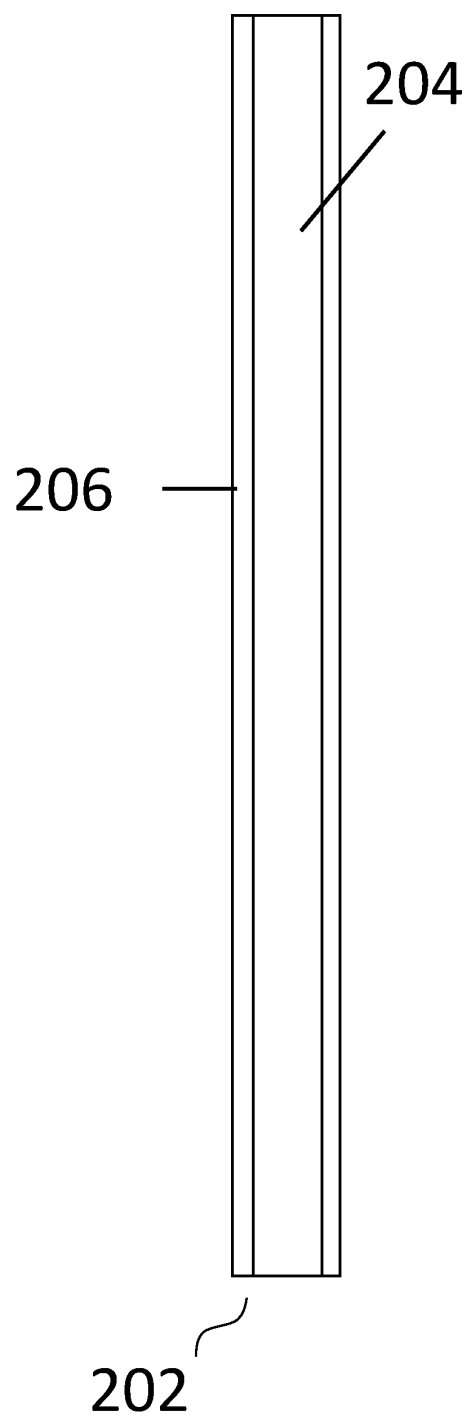


FIG. 3A

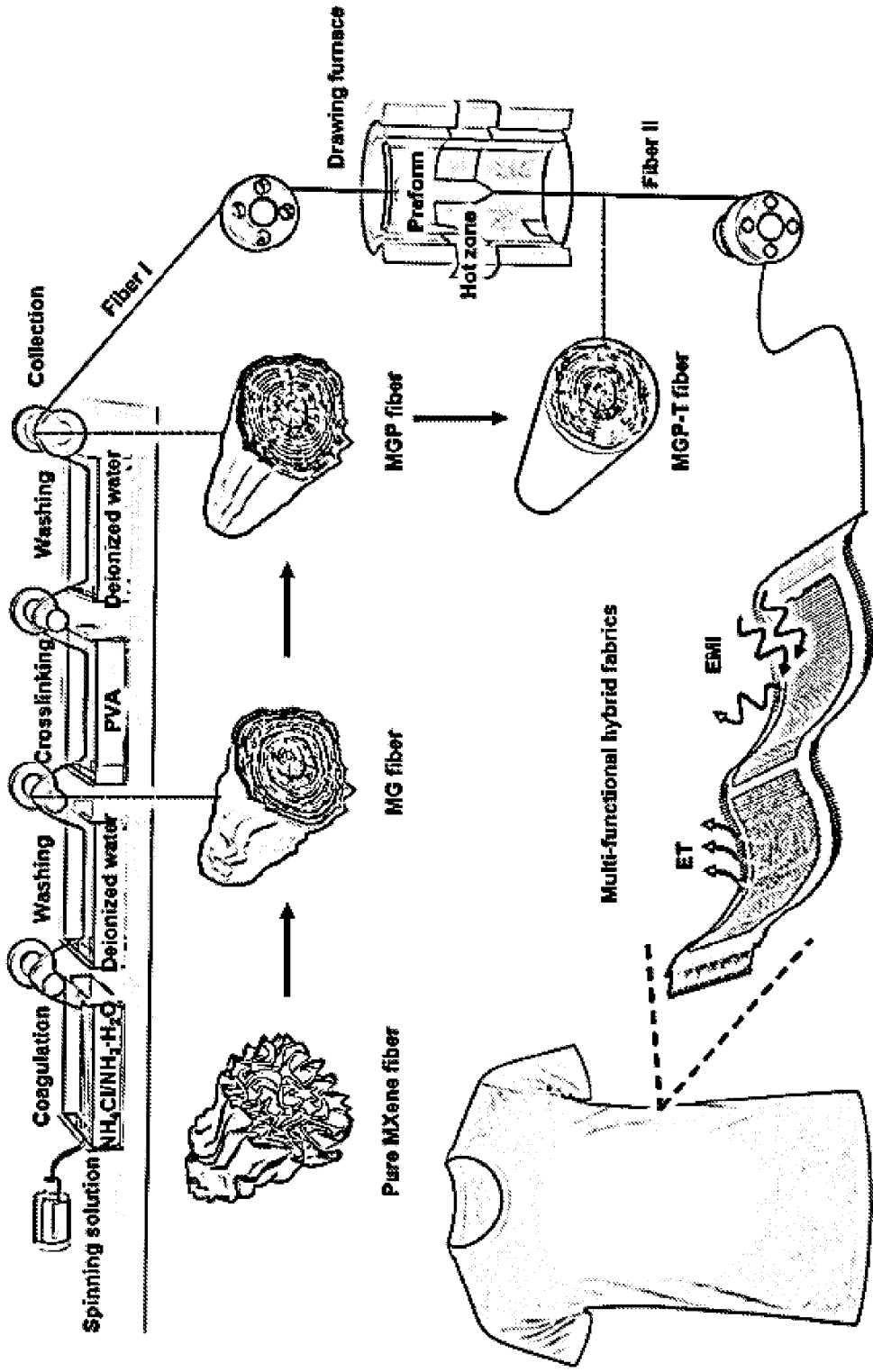


FIG. 3B

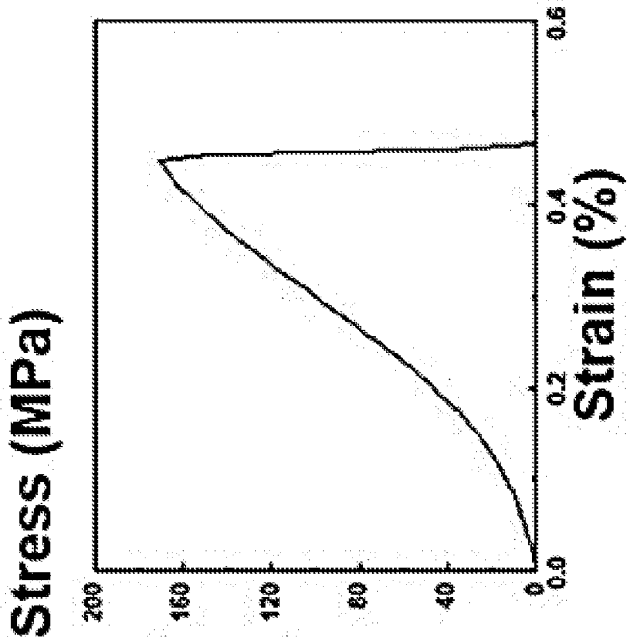
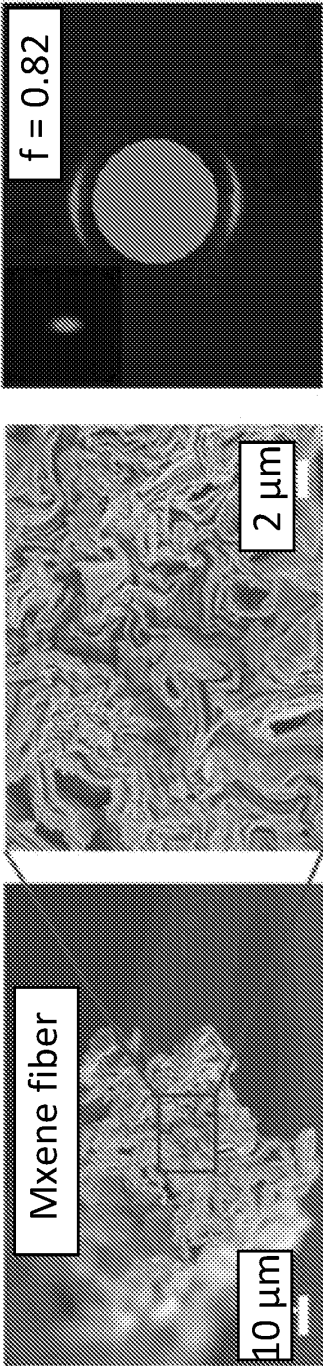


FIG. 3C

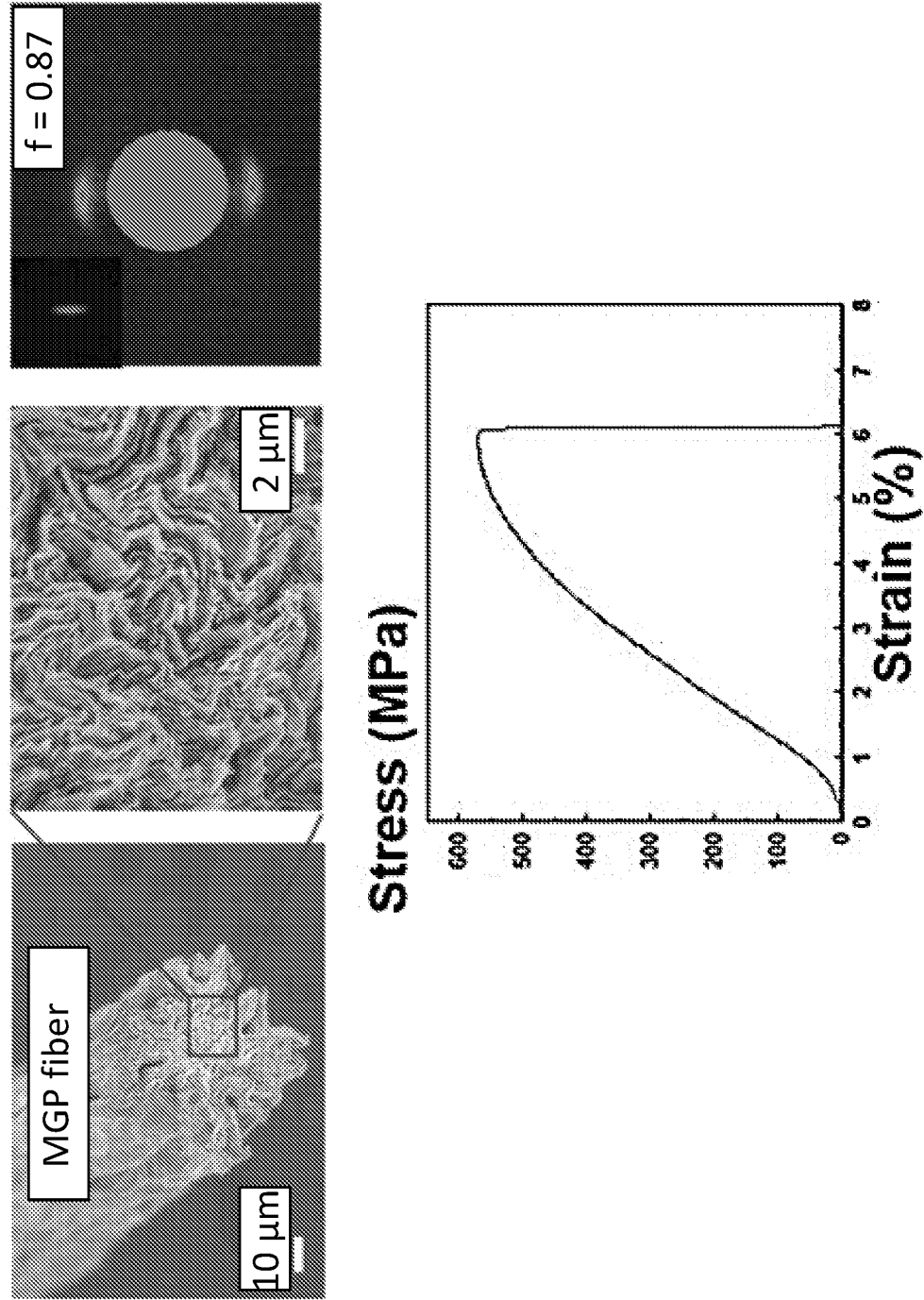


FIG. 3D

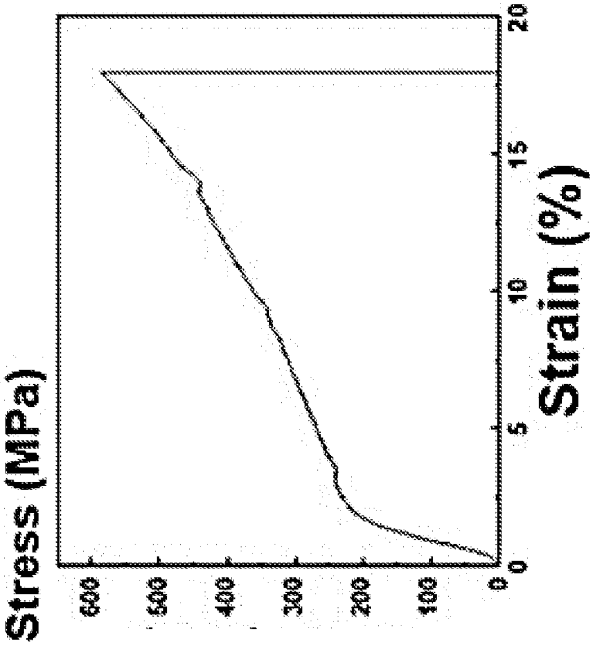
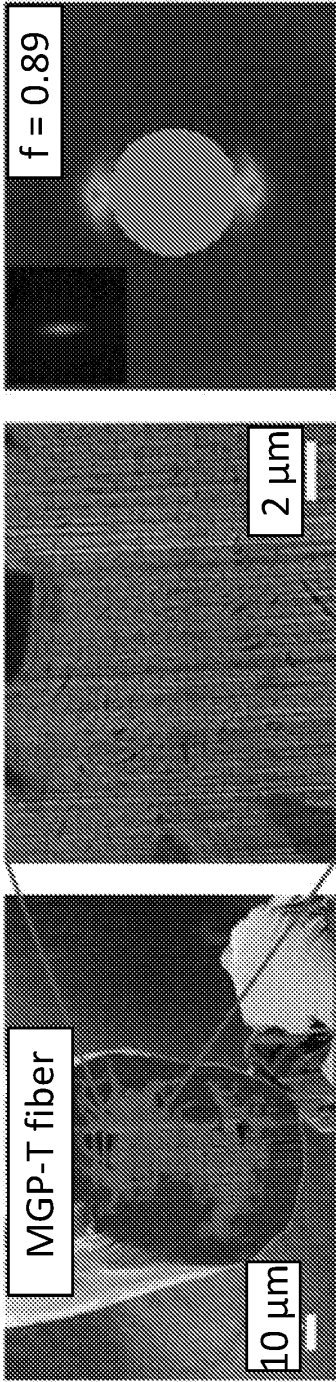


FIG. 4A

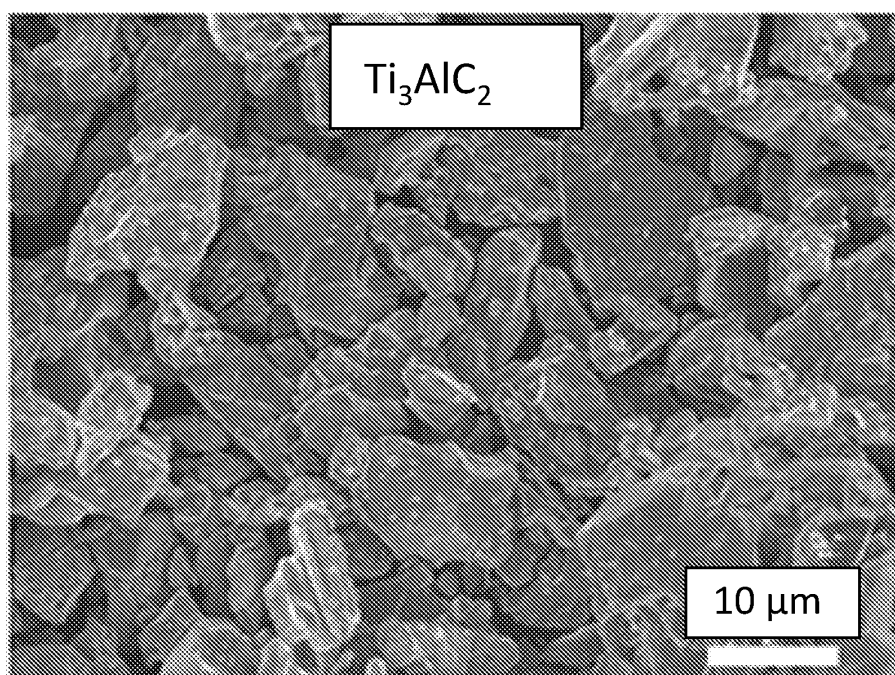


FIG. 4B

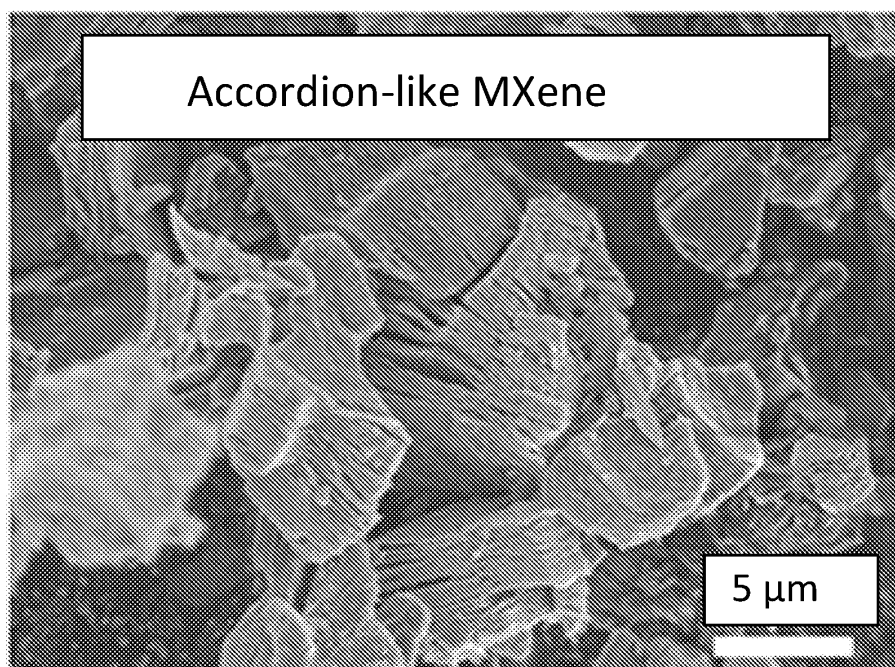


FIG. 5A

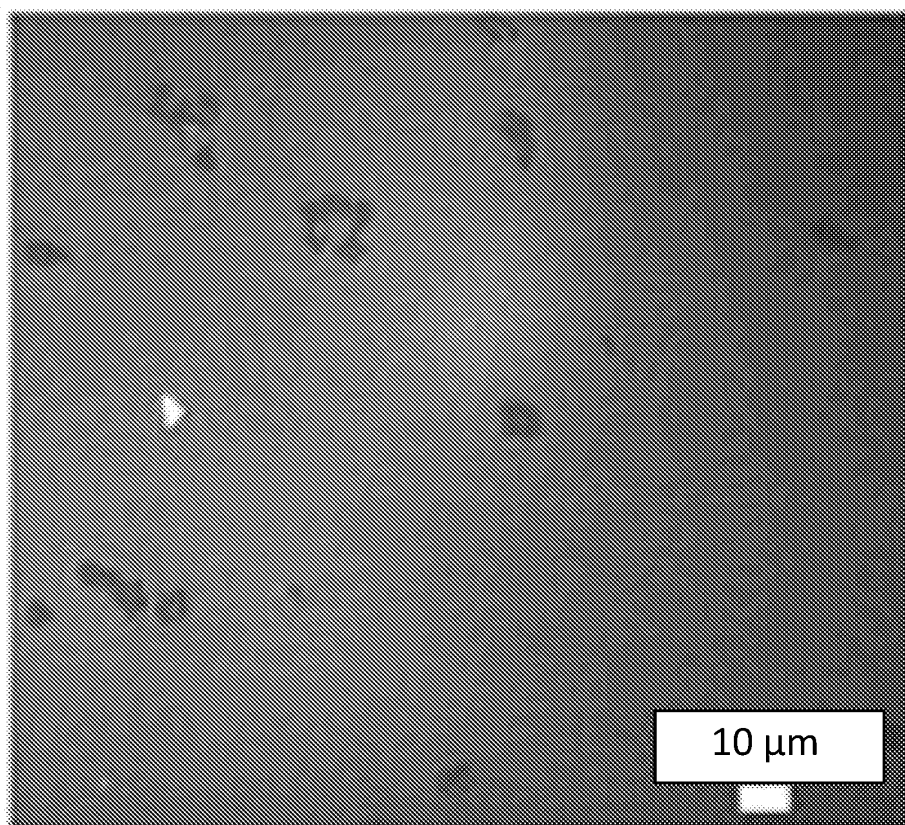


FIG. 5B

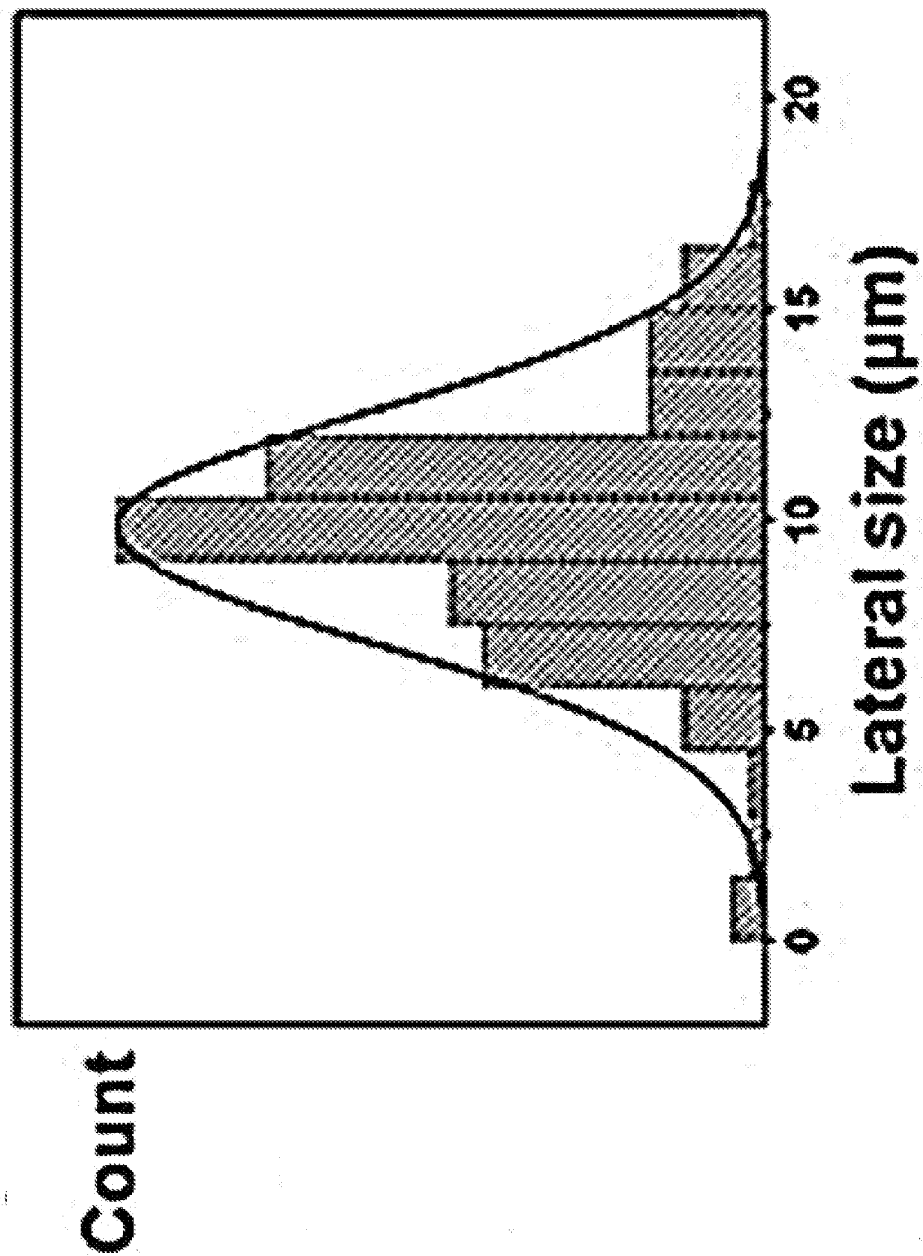


FIG. 5C

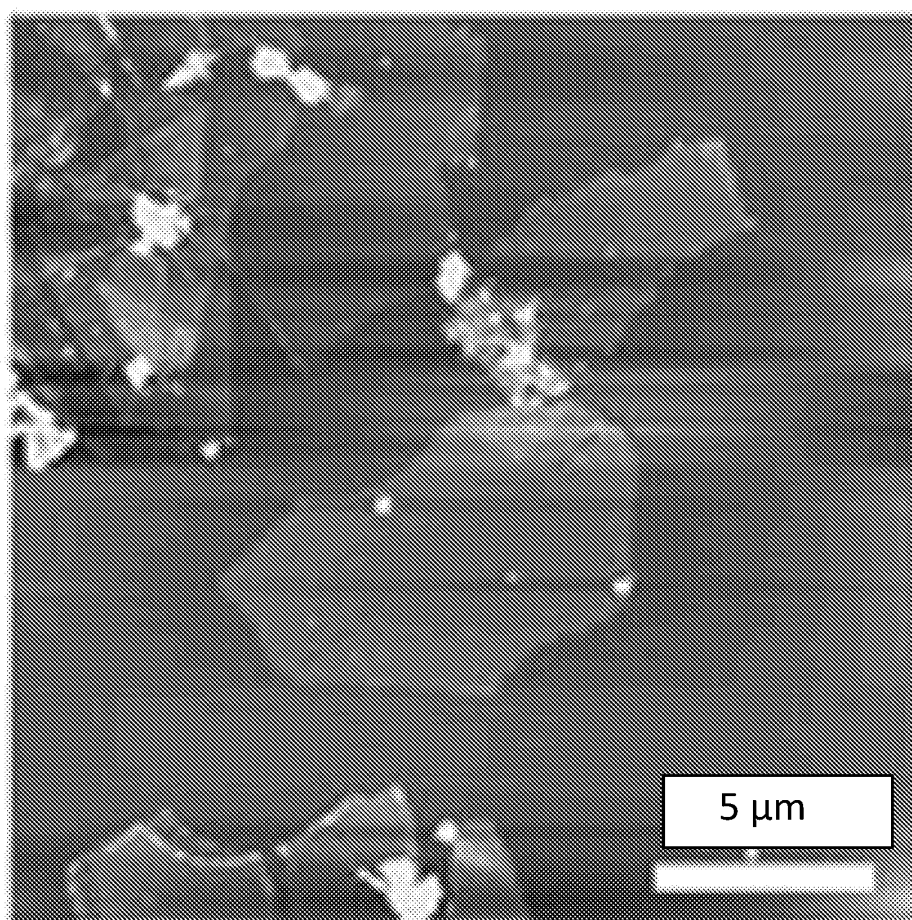


FIG. 5D

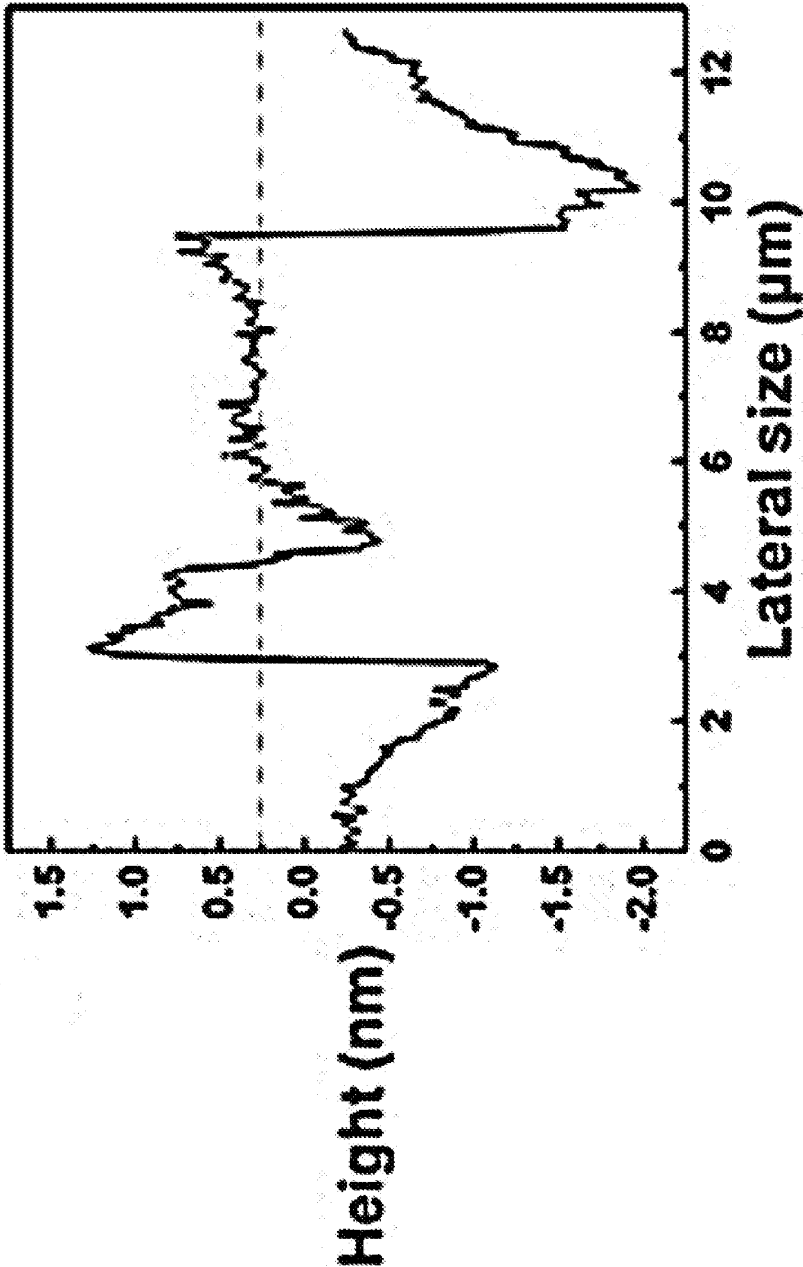


FIG. 6A

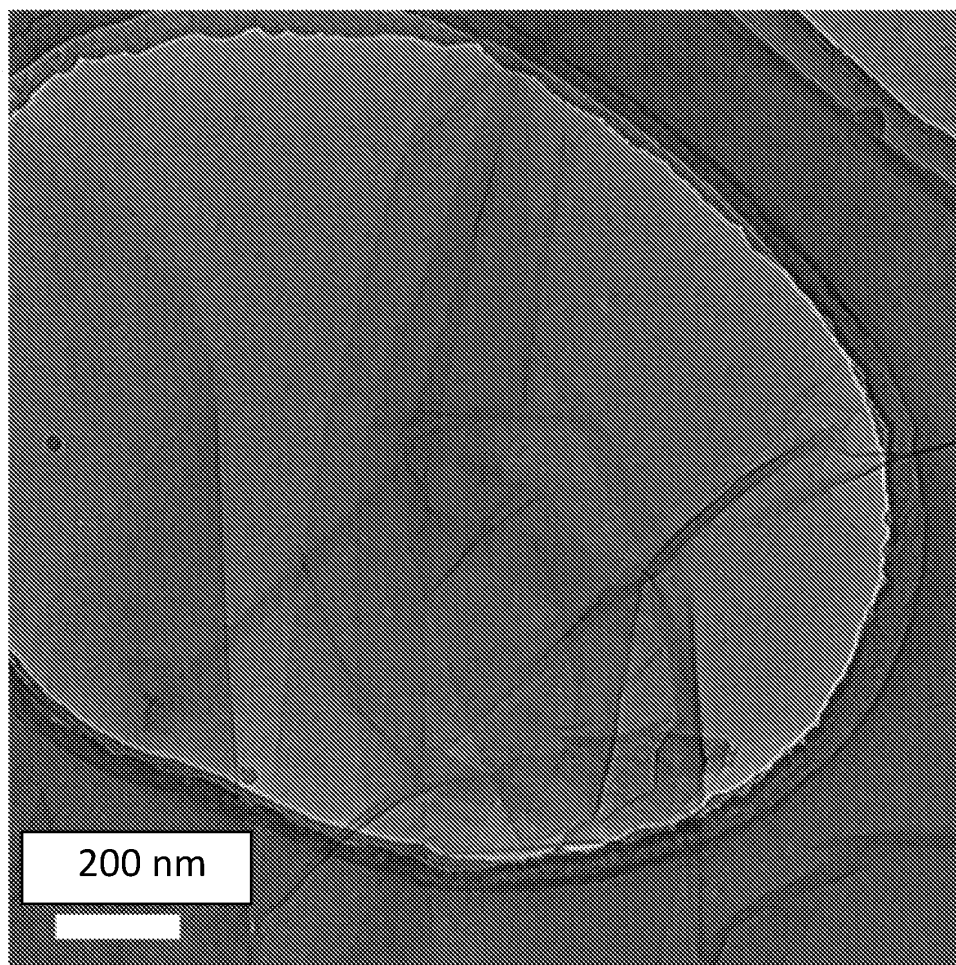


FIG. 6B

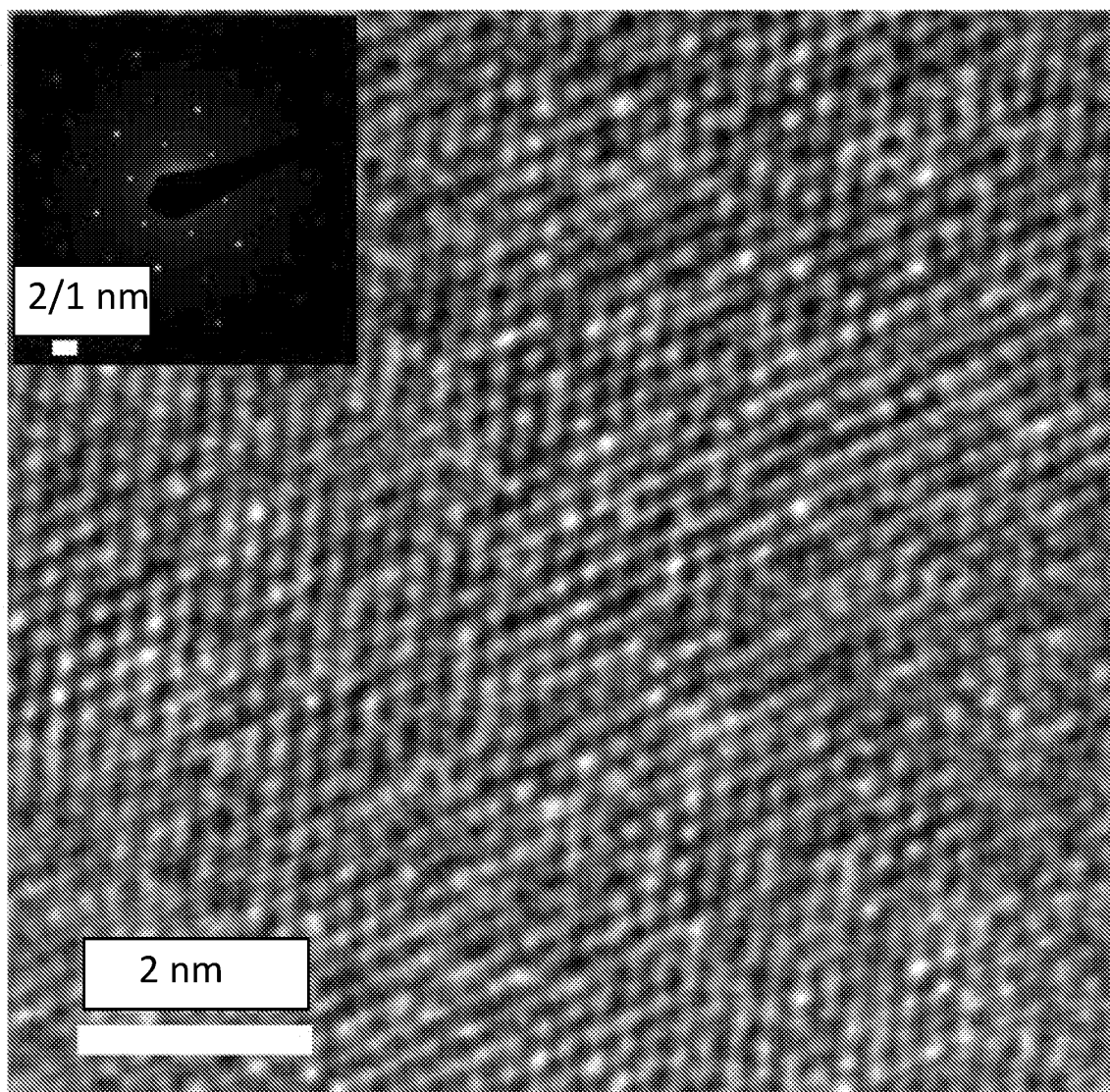


FIG. 7

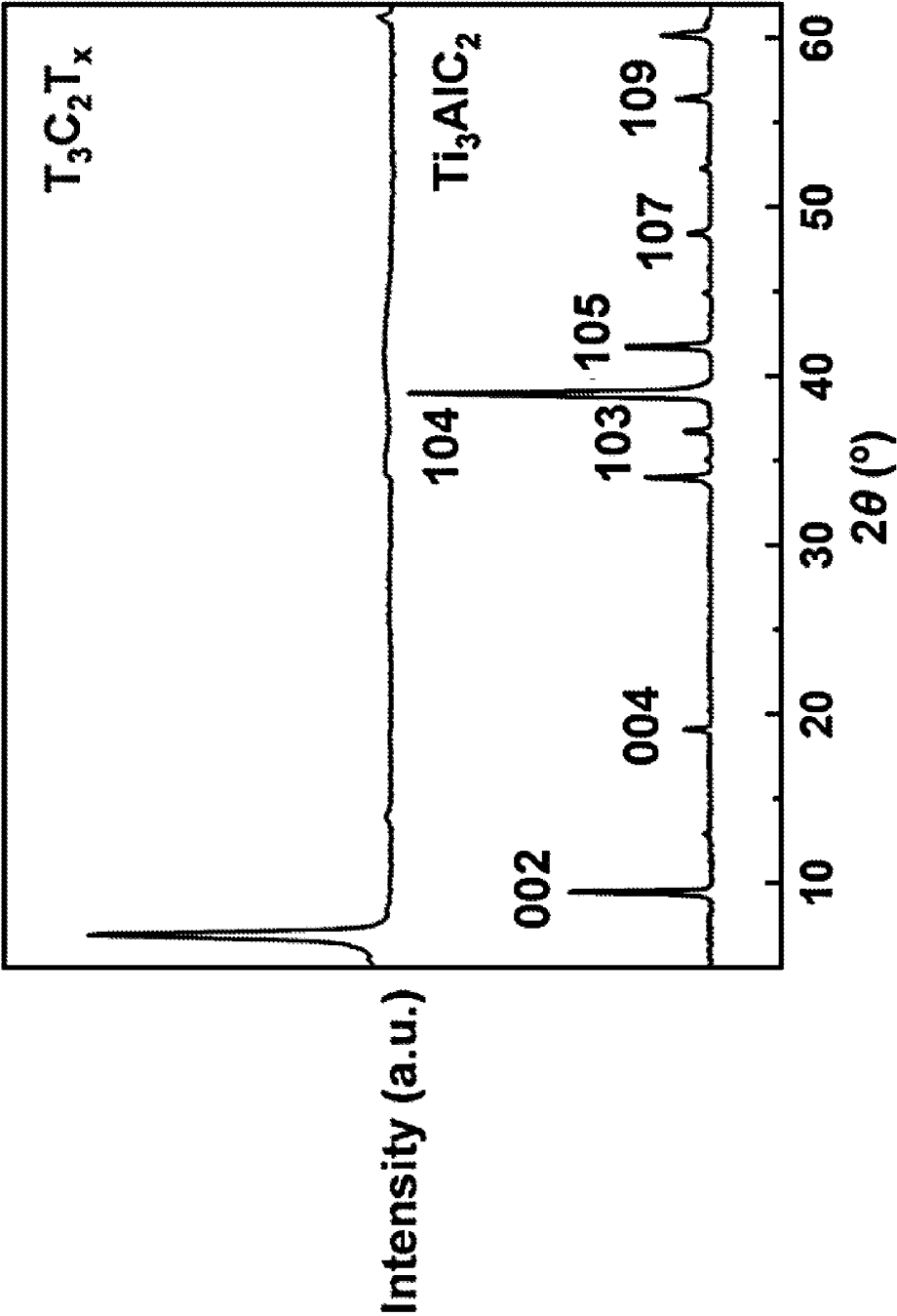


FIG. 8

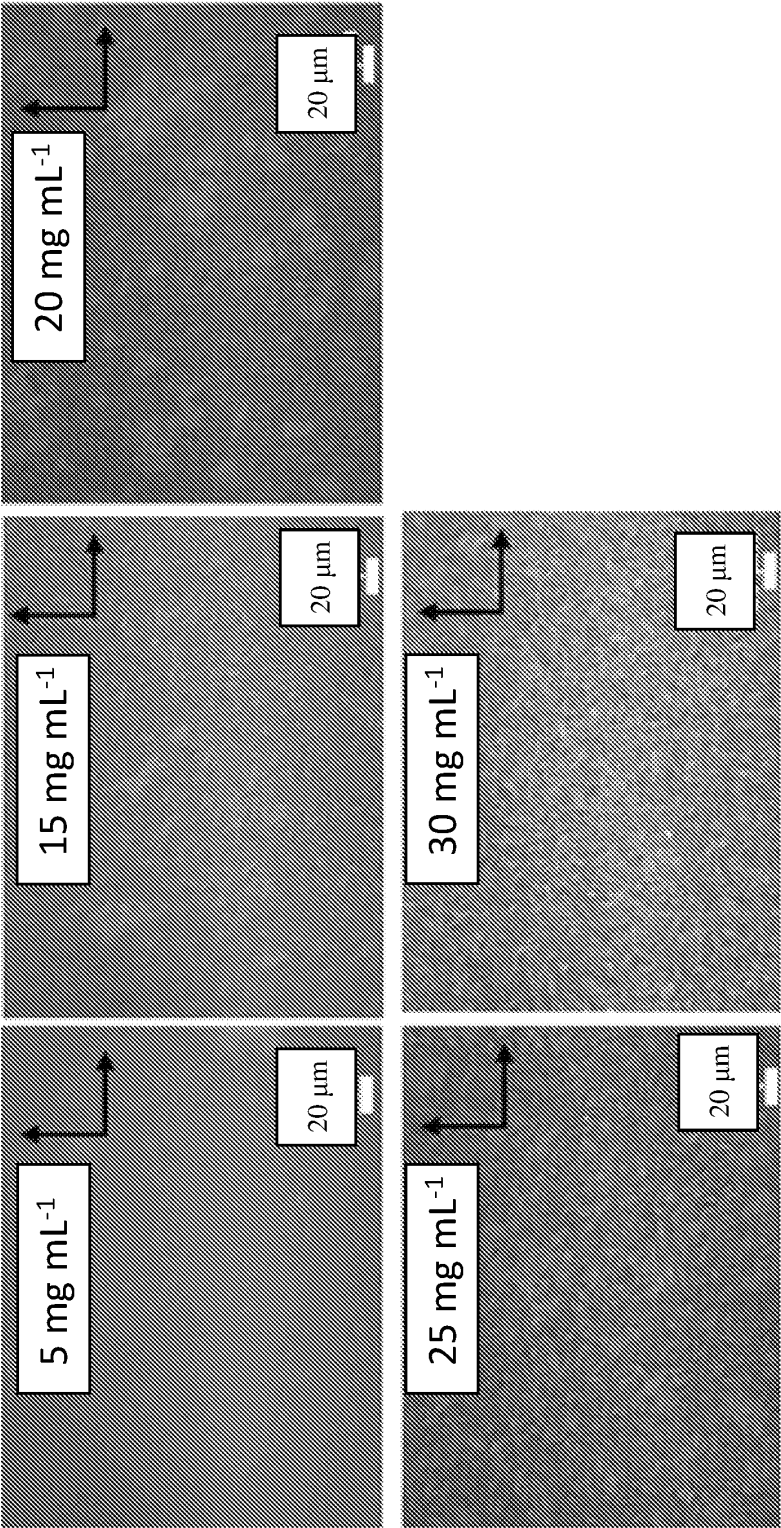


FIG. 9A

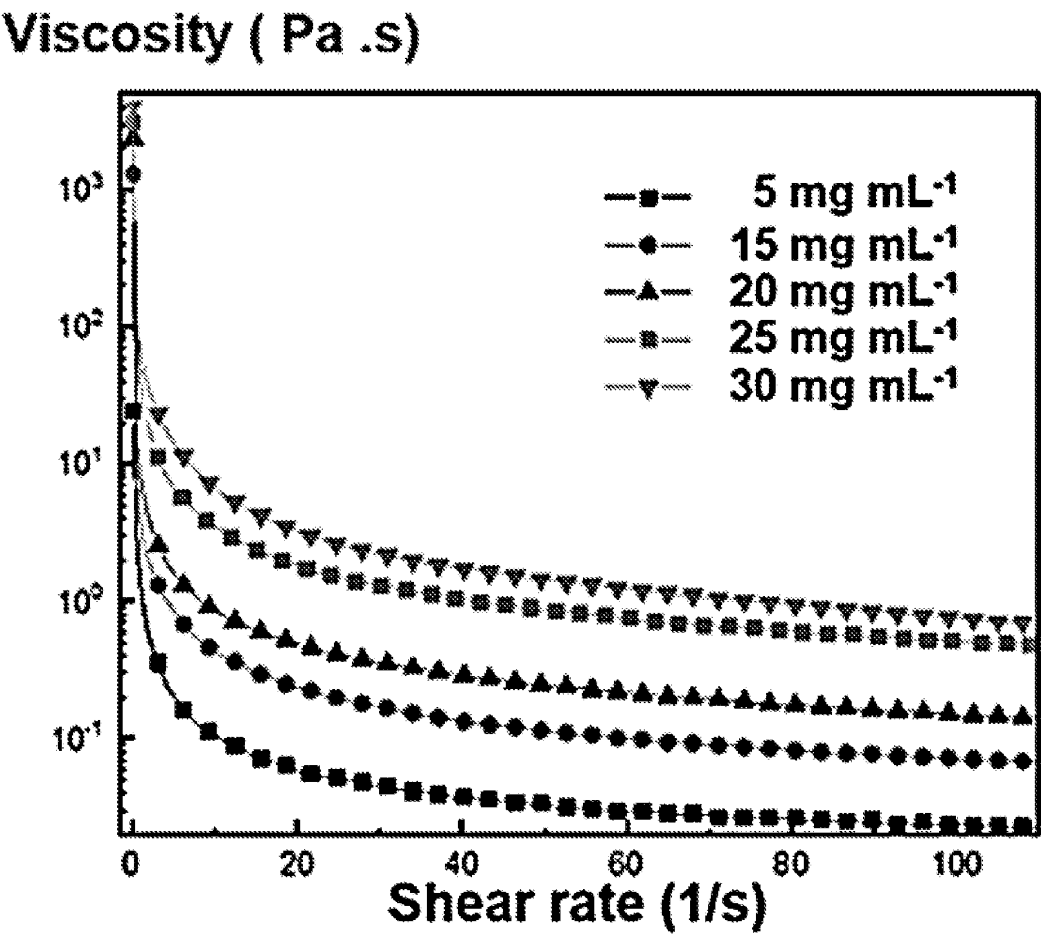


FIG. 9B

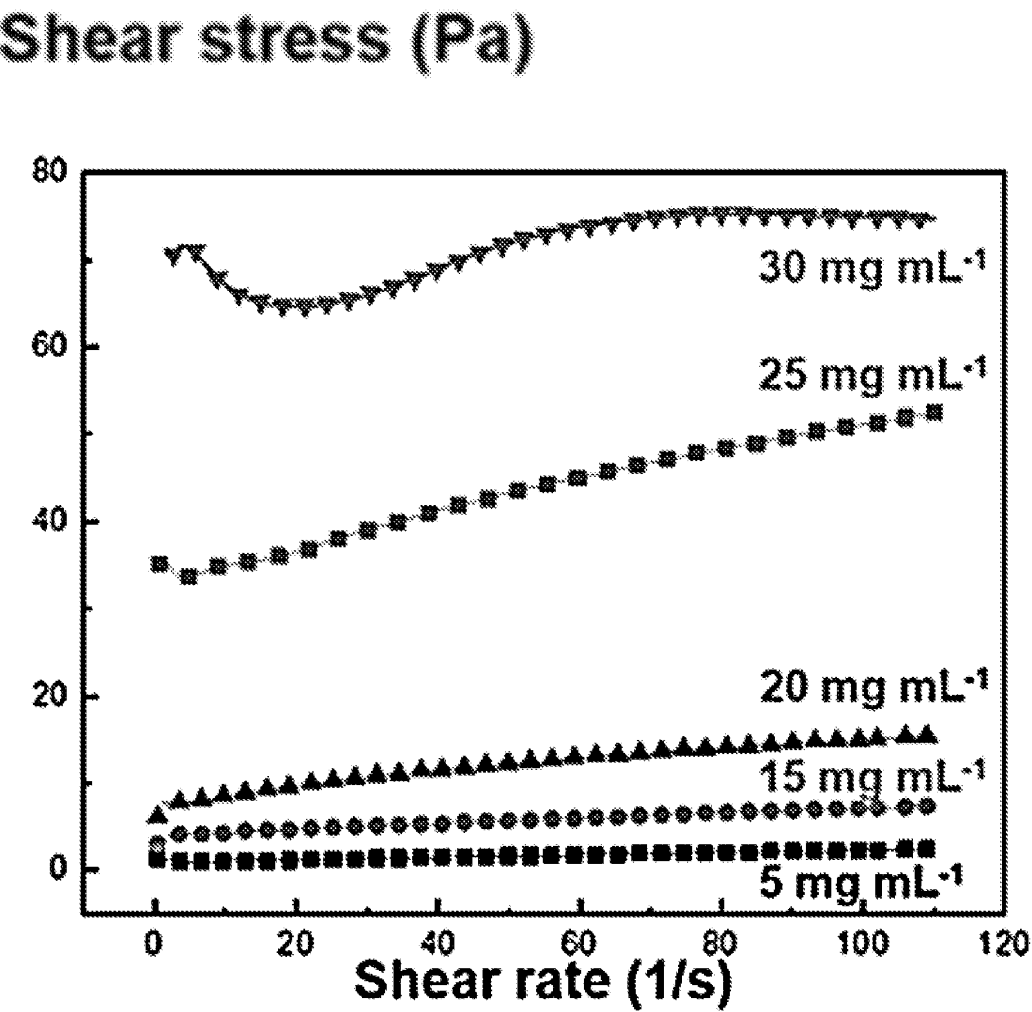


FIG. 9C

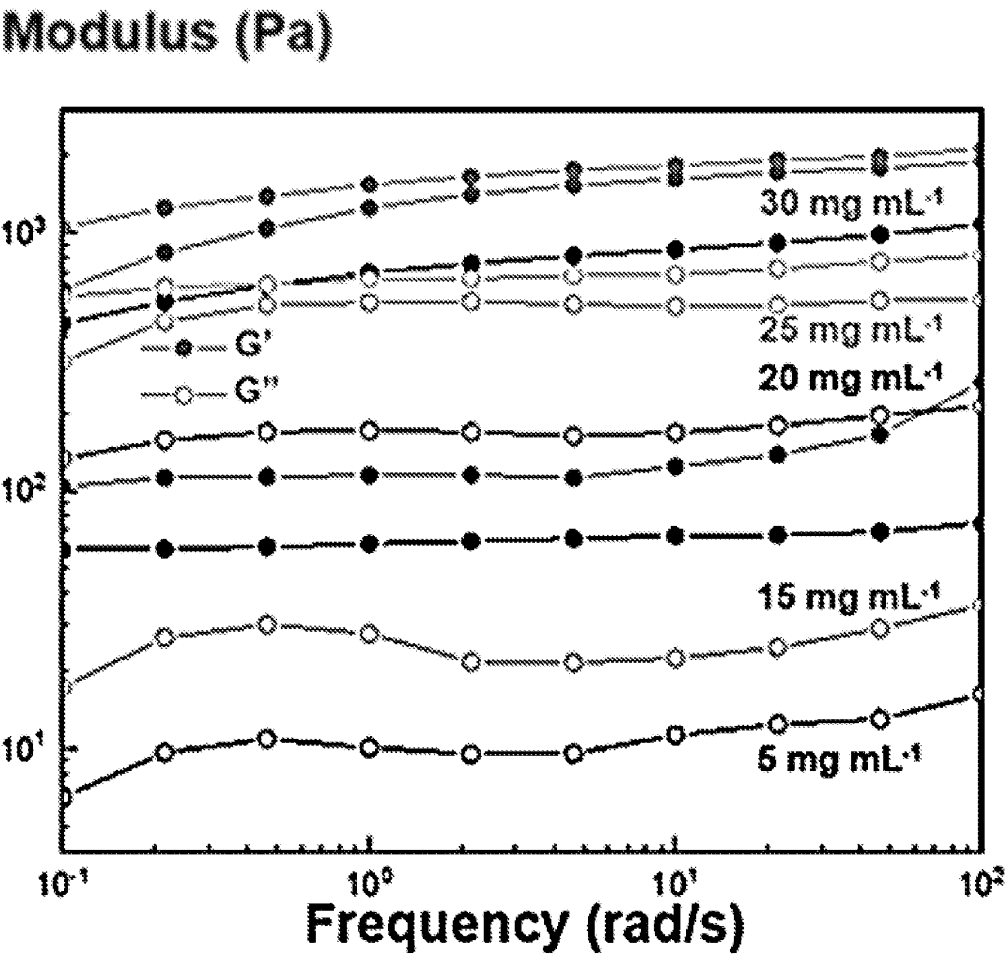


FIG. 10A

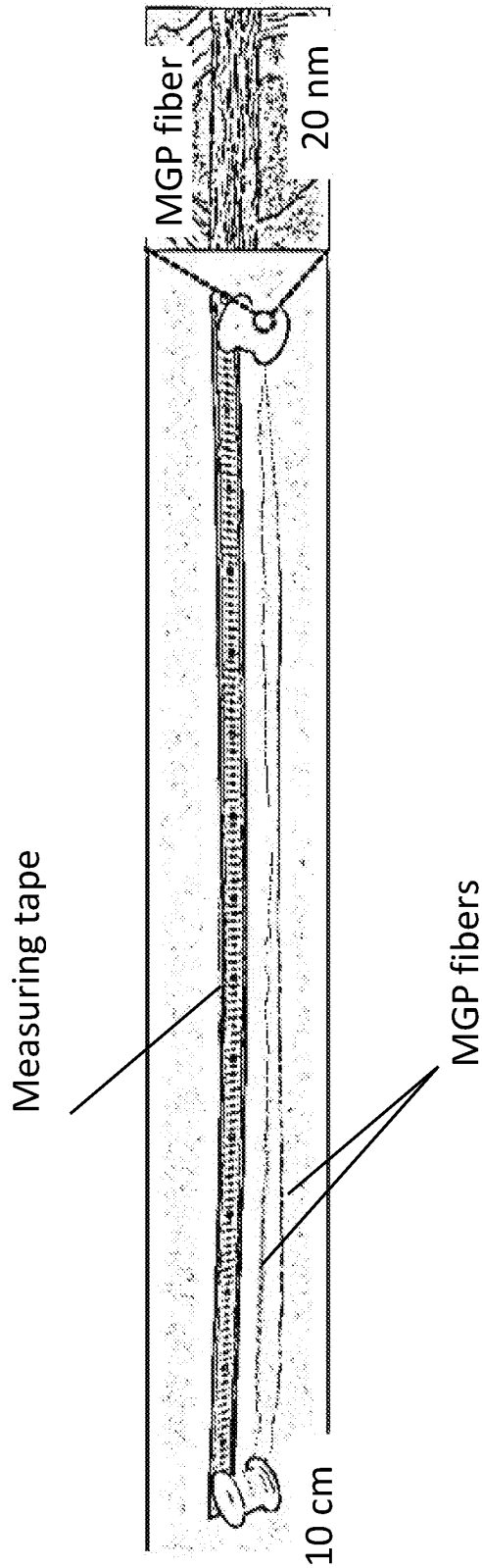


FIG. 10B

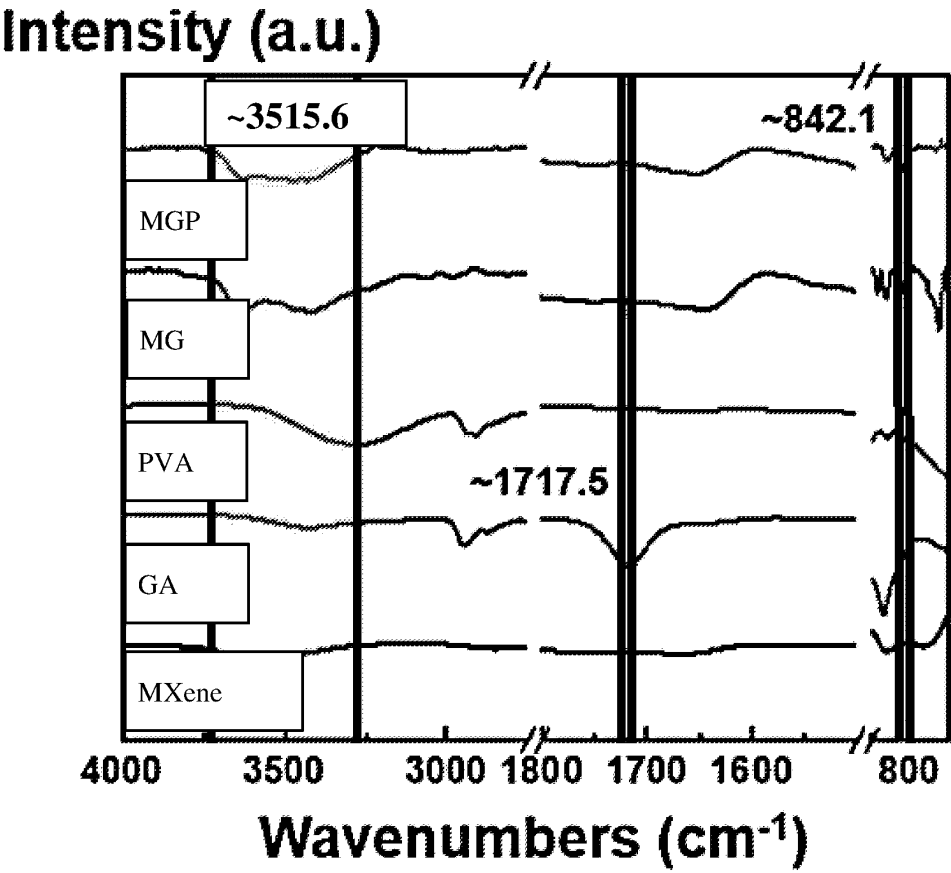


FIG. 10C

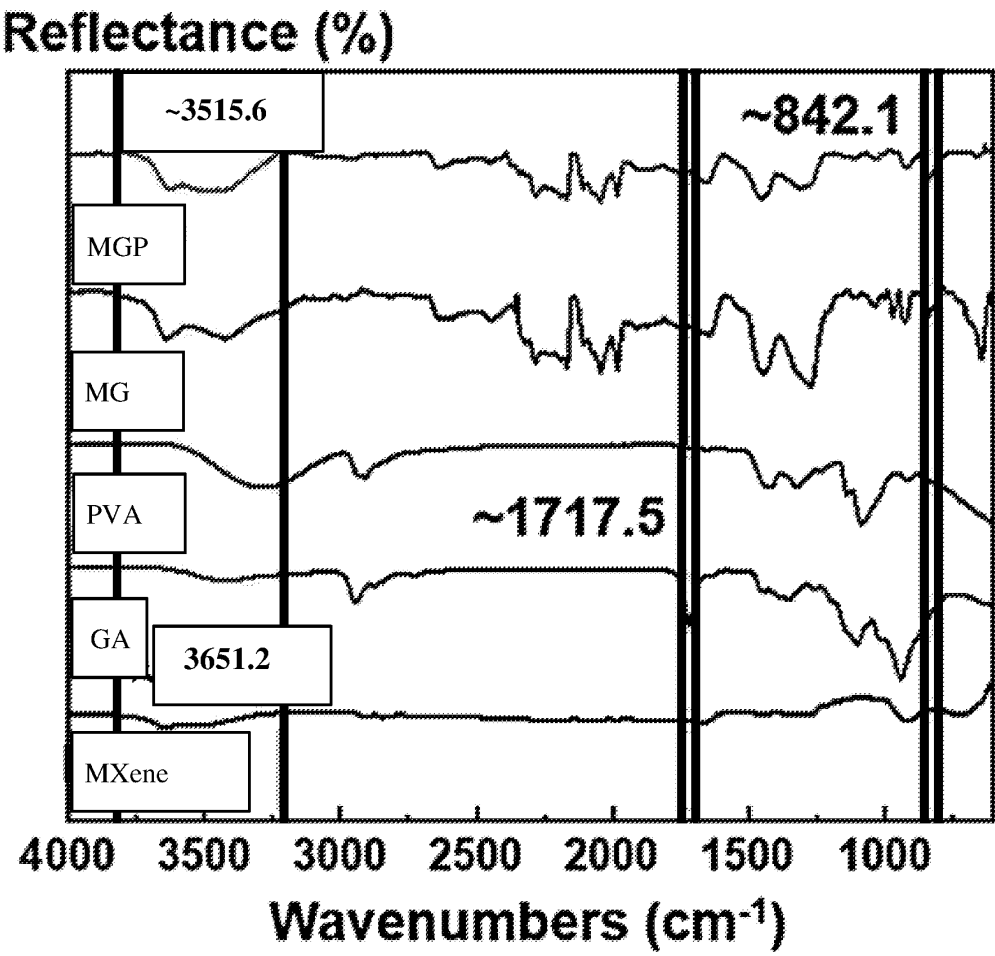


FIG. 10D

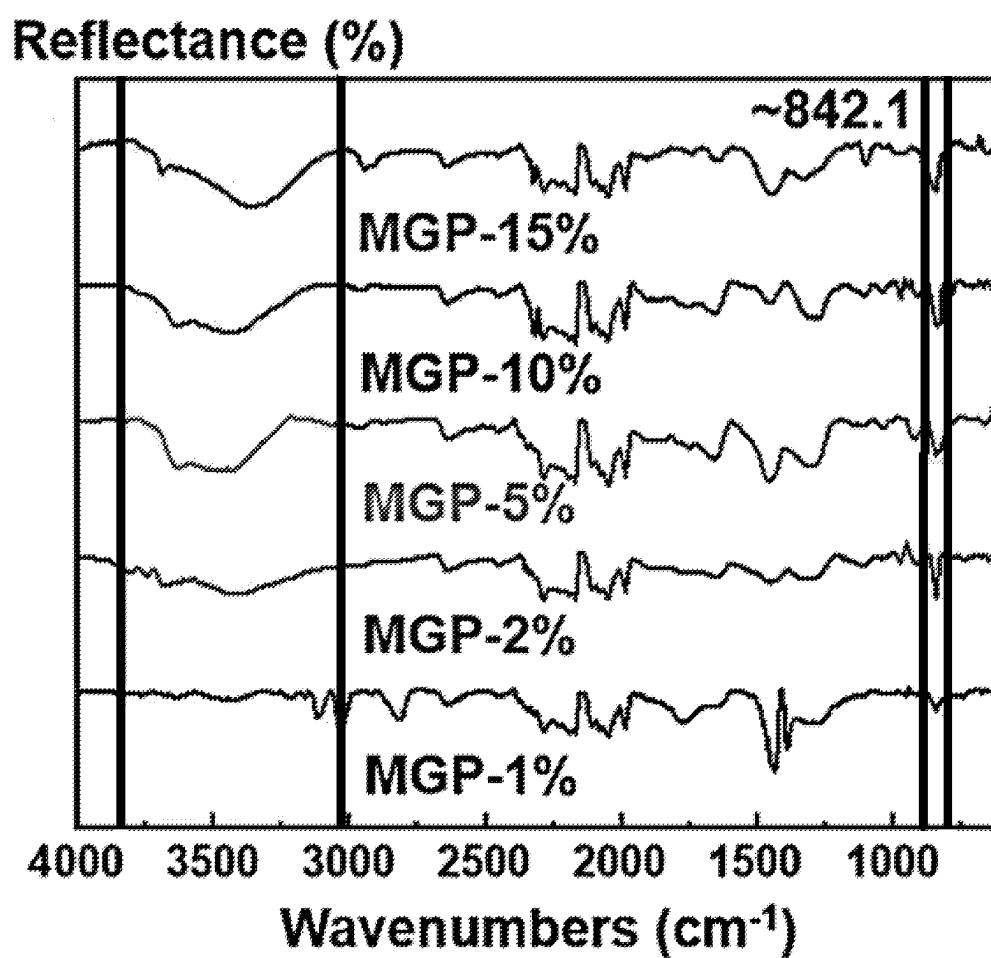


FIG. 11

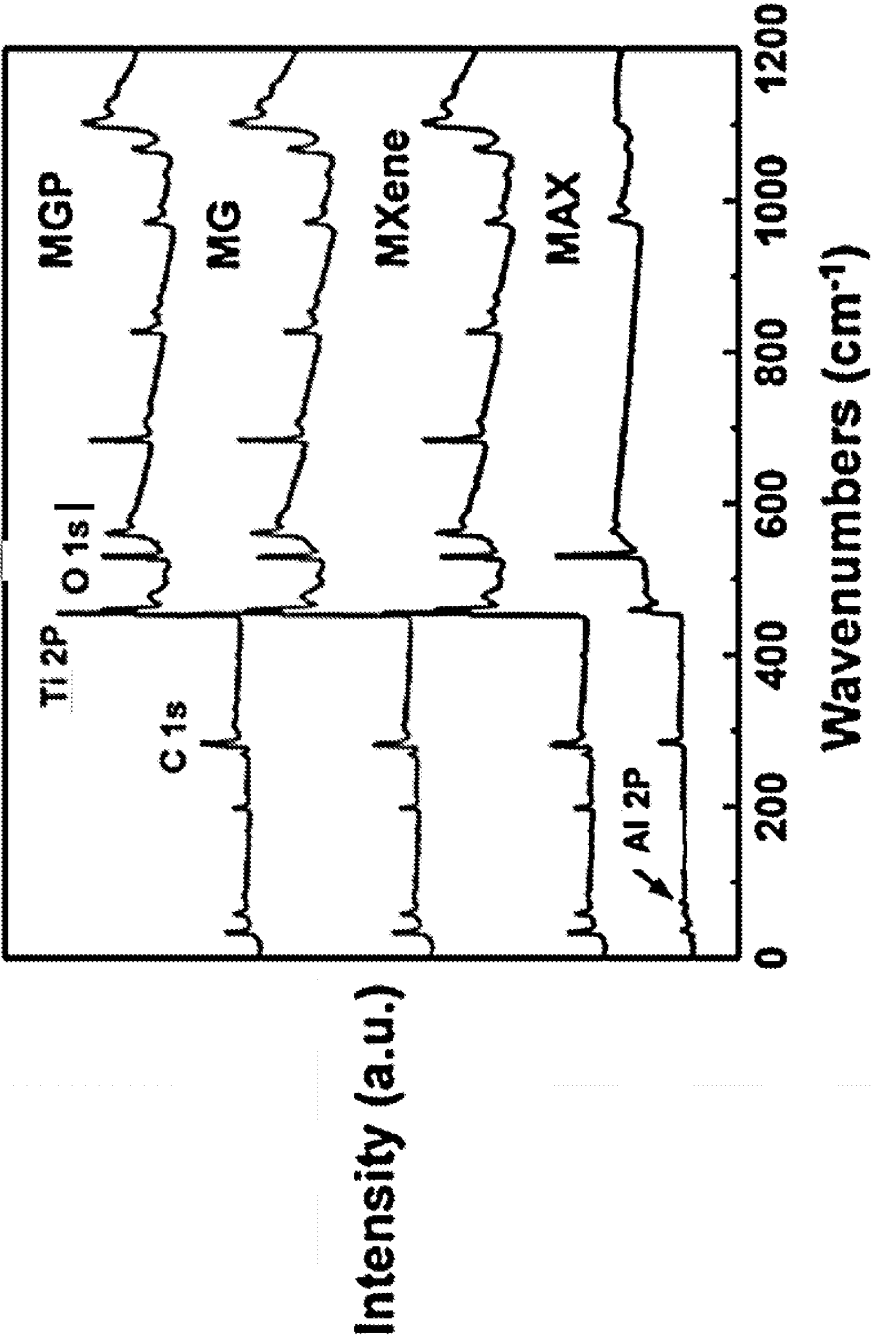


FIG. 12A

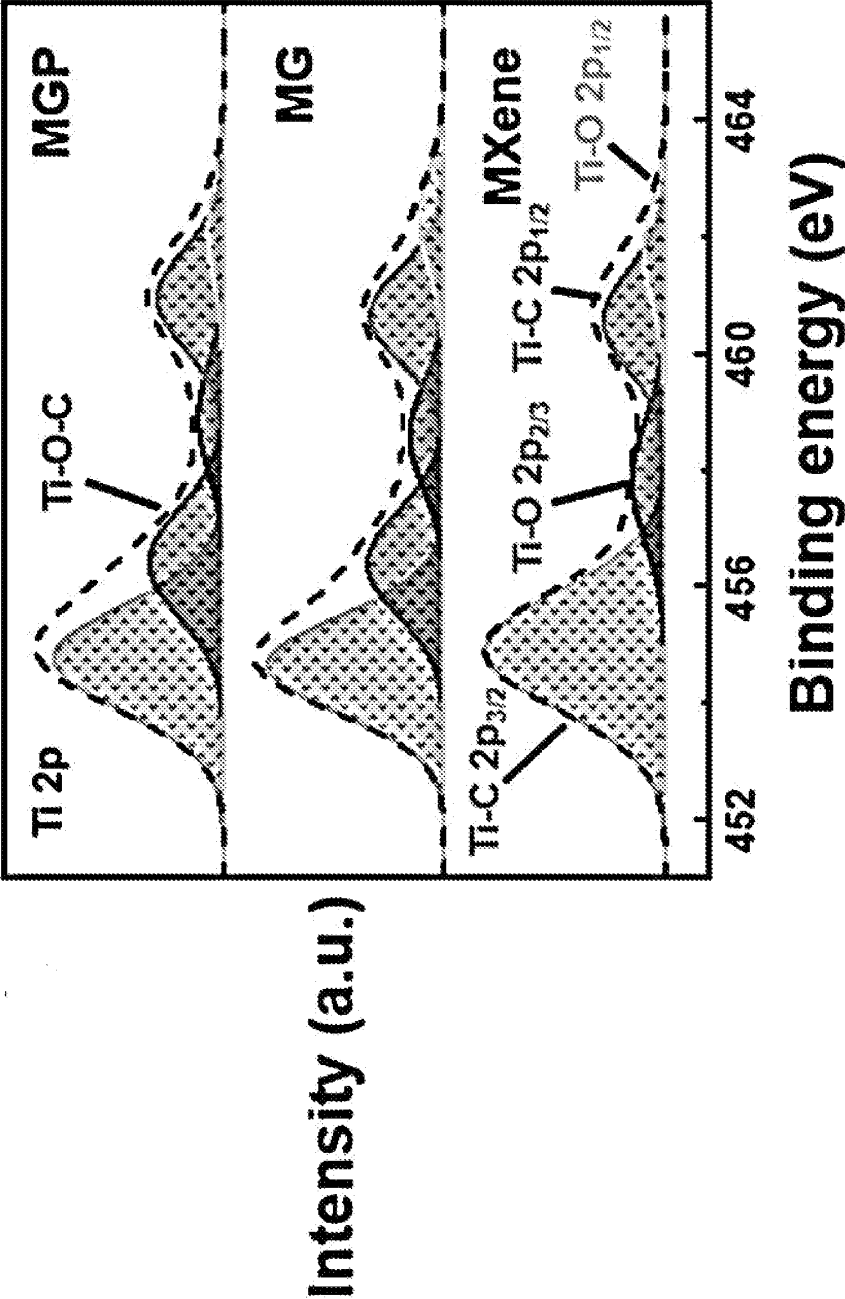


FIG. 12B

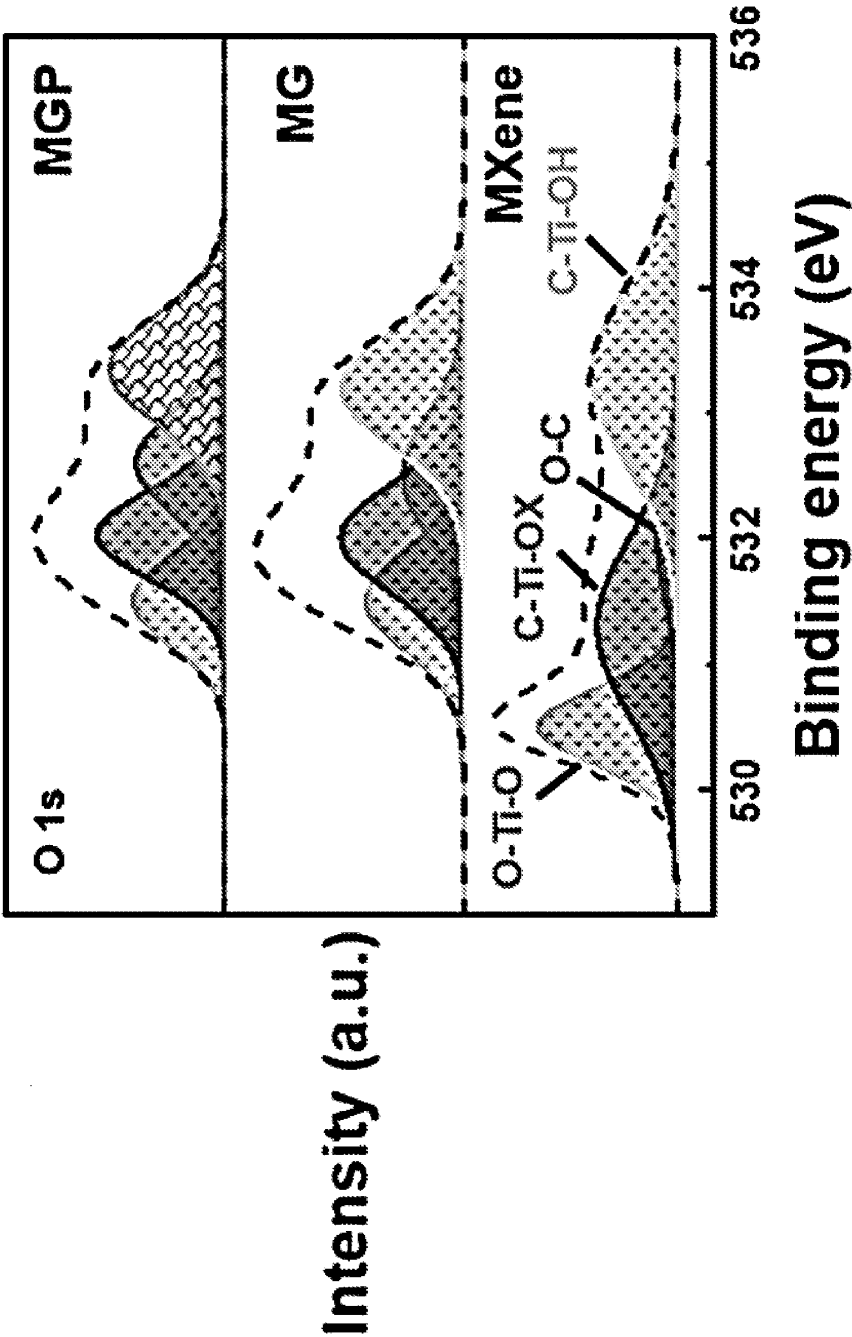


FIG. 12C

Samples	O-Ti-O (%)	C-Ti-OX (%)	O-C (%)	C-Ti-OH (%)
MXene	24.7	33.5	6.2	35.6
MG	22.3	29.9	16.4	31.4
MGP	20.0	27.7	22.0	30.3

FIG. 13A

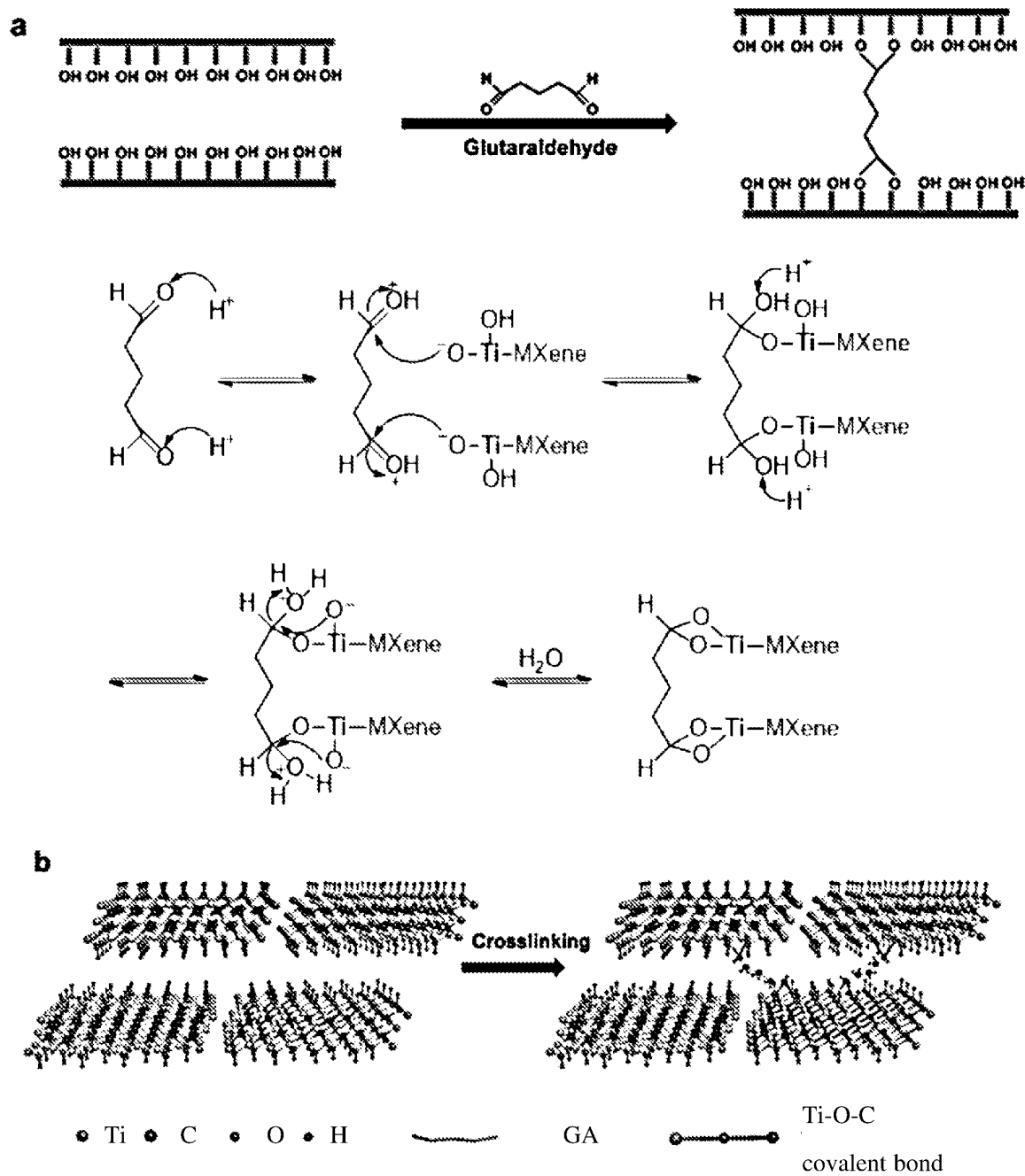


FIG. 13B

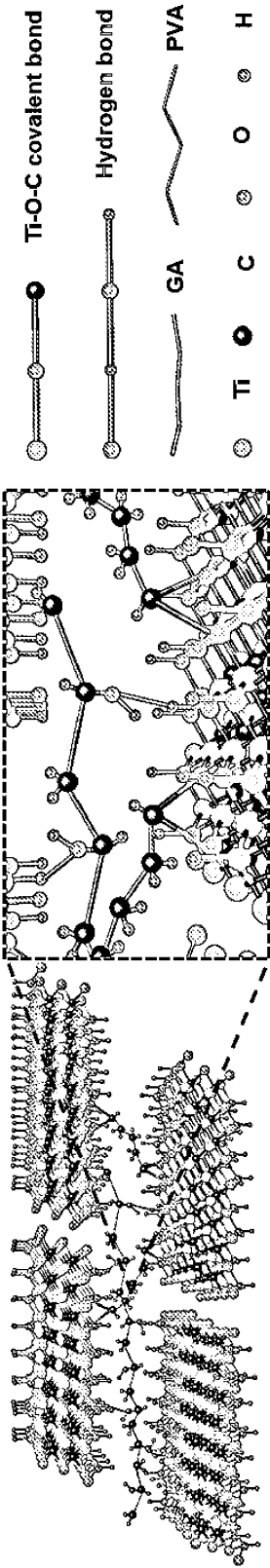


FIG. 14A

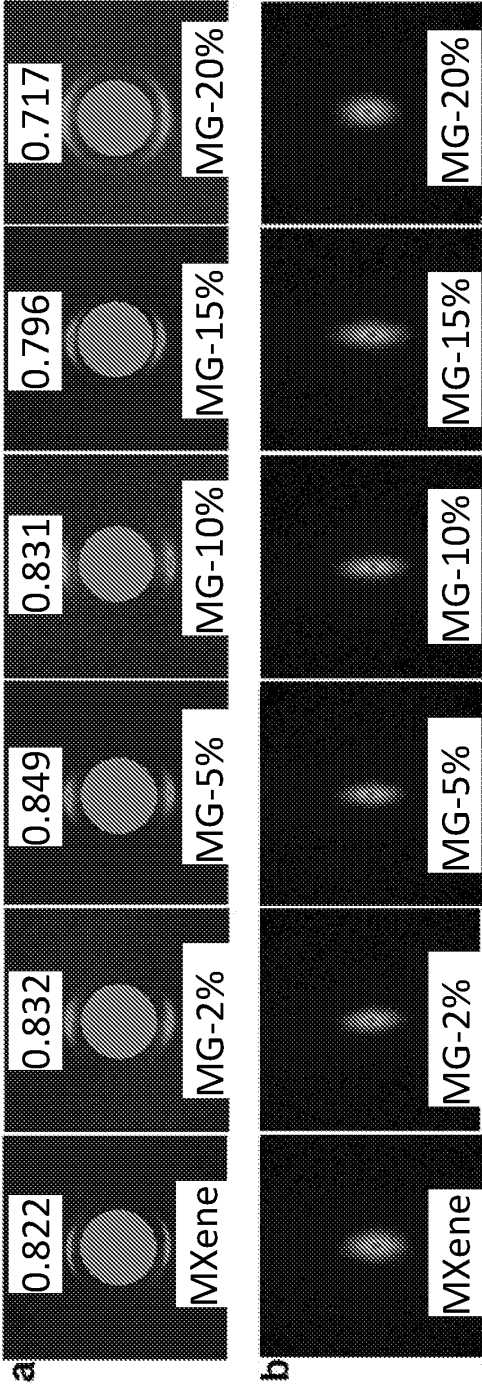


FIG. 14B

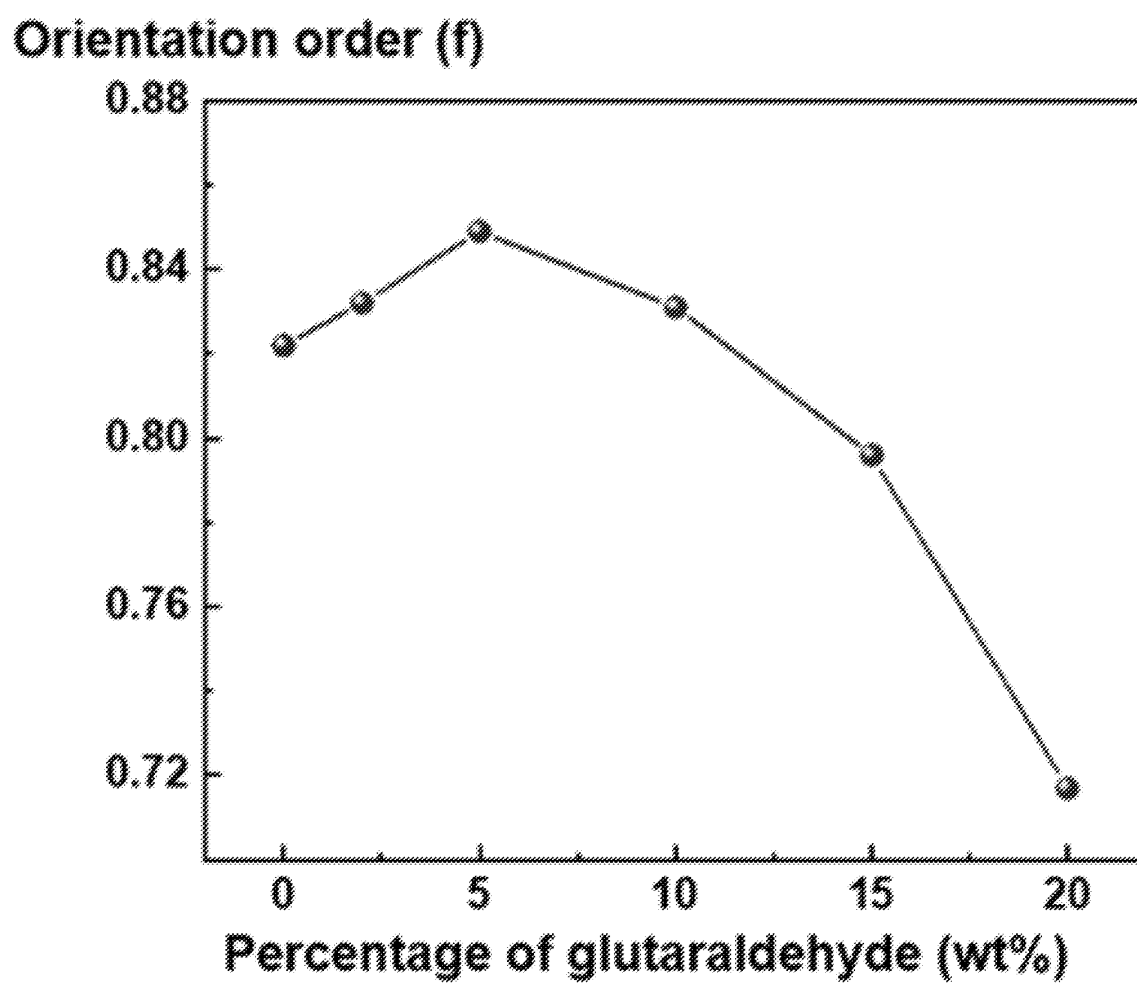


FIG. 14C

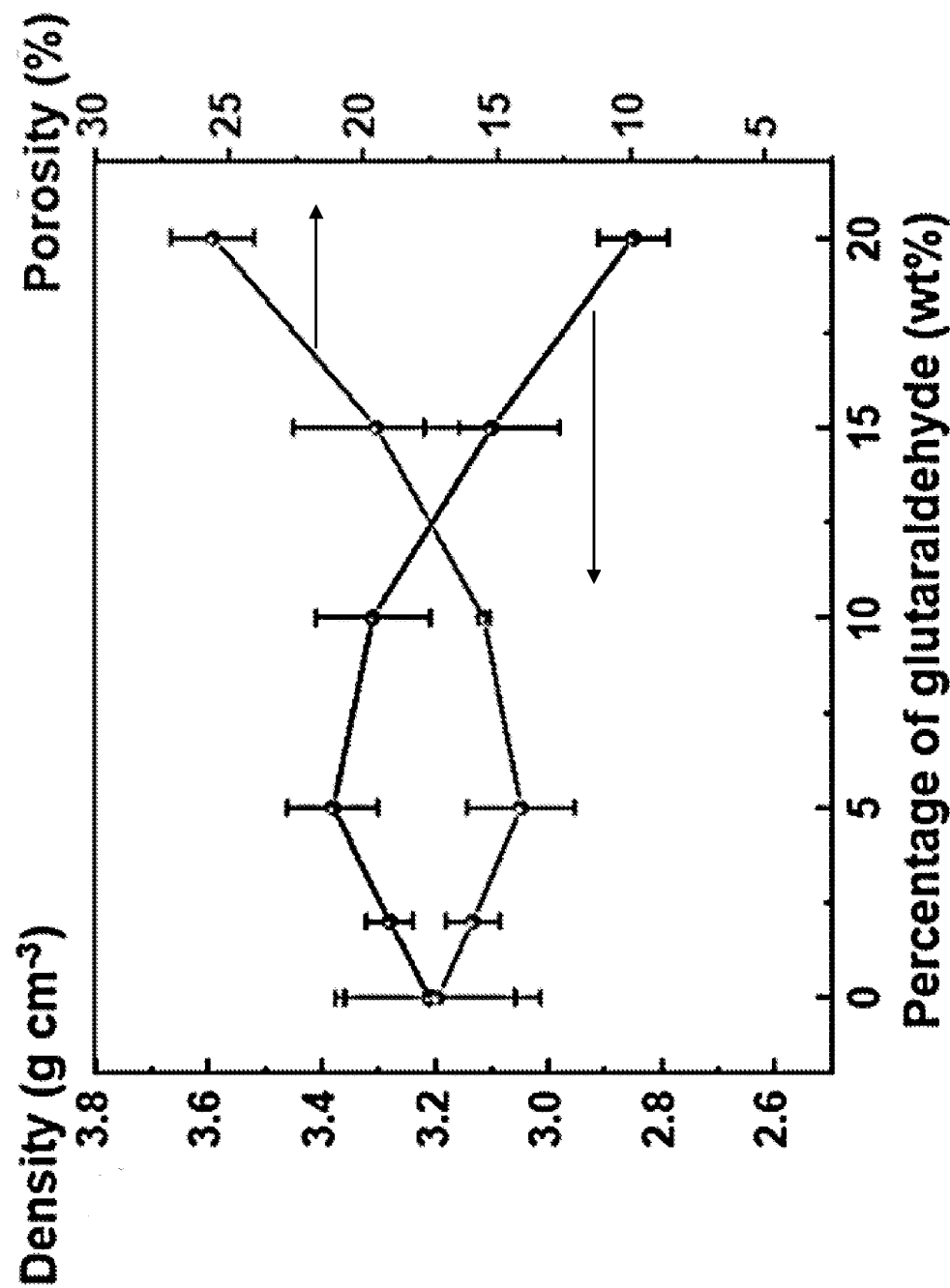


FIG. 15

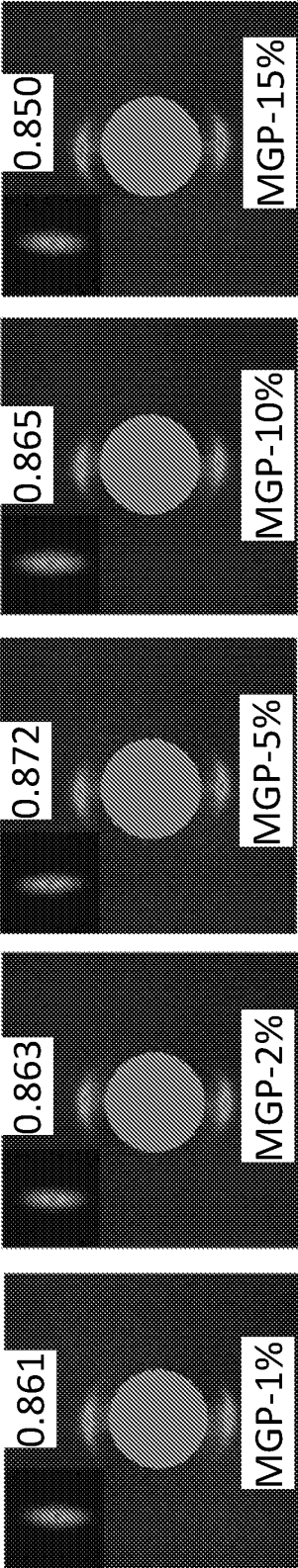


FIG. 16A

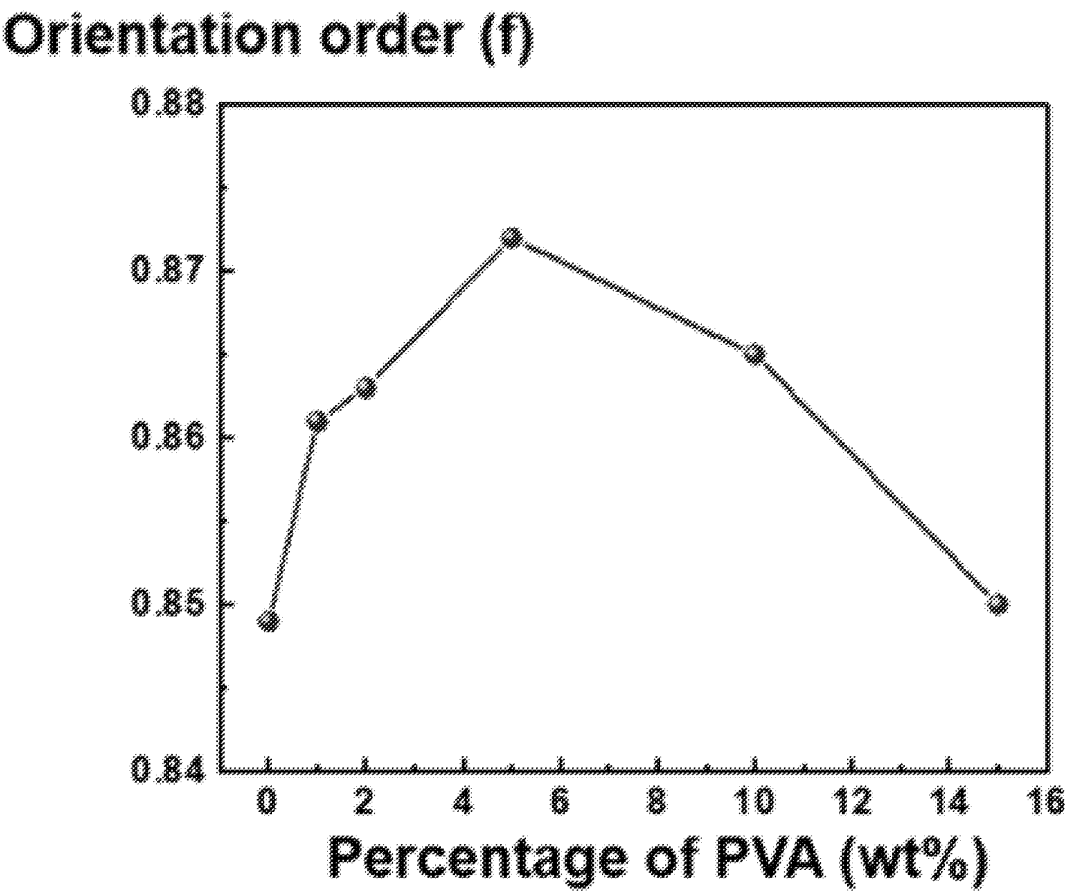


FIG. 16B

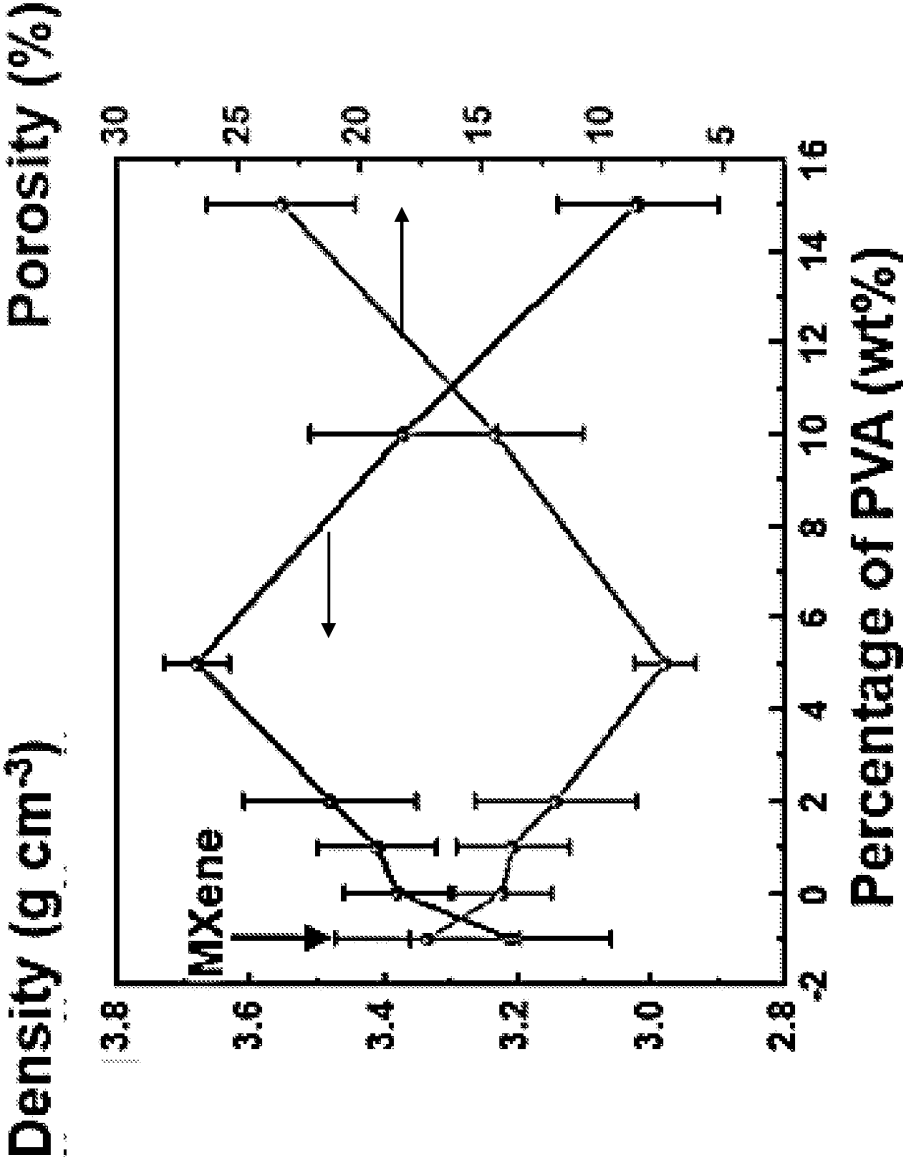


FIG. 16C

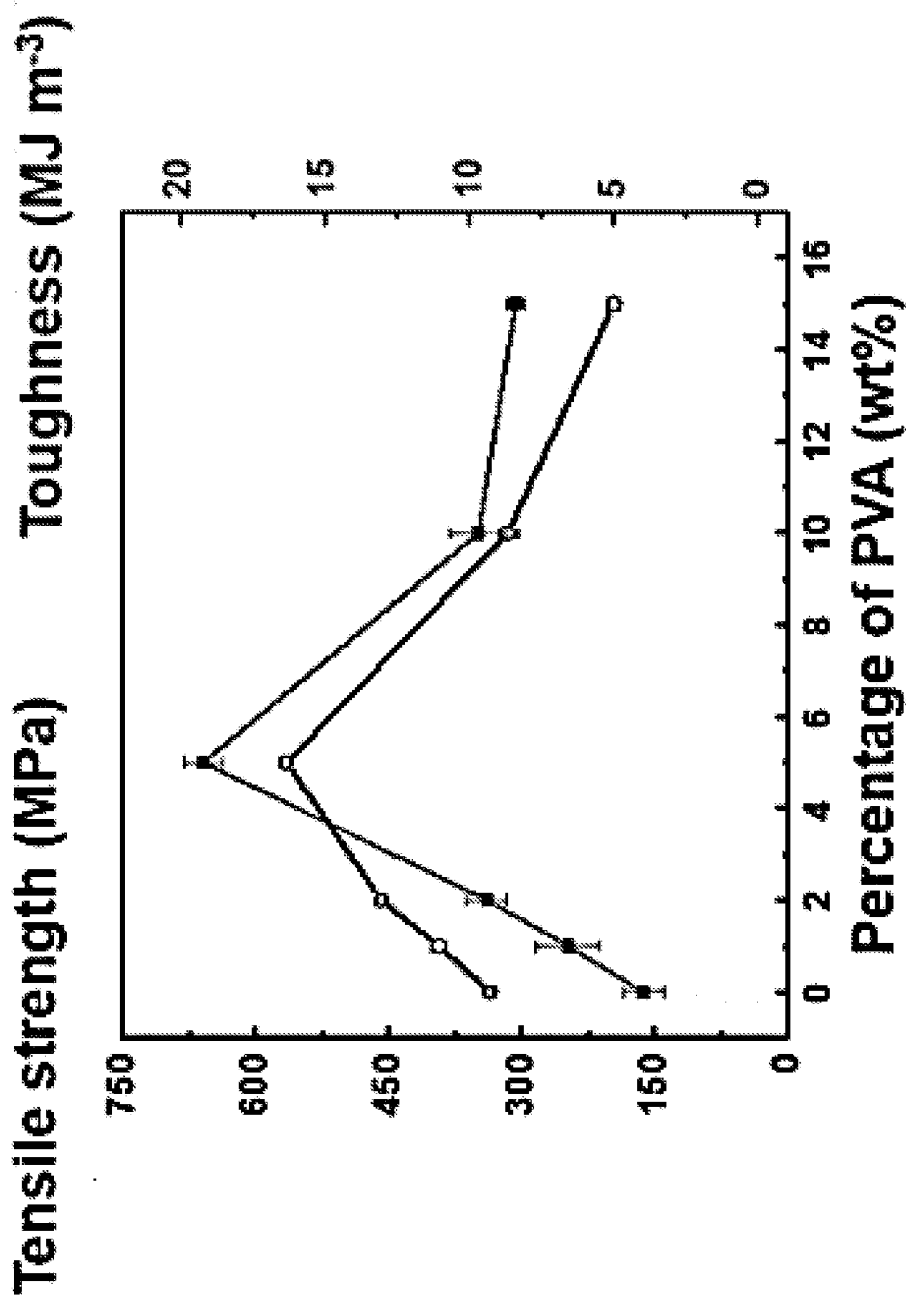


FIG. 17A

Intensity (a. u.)

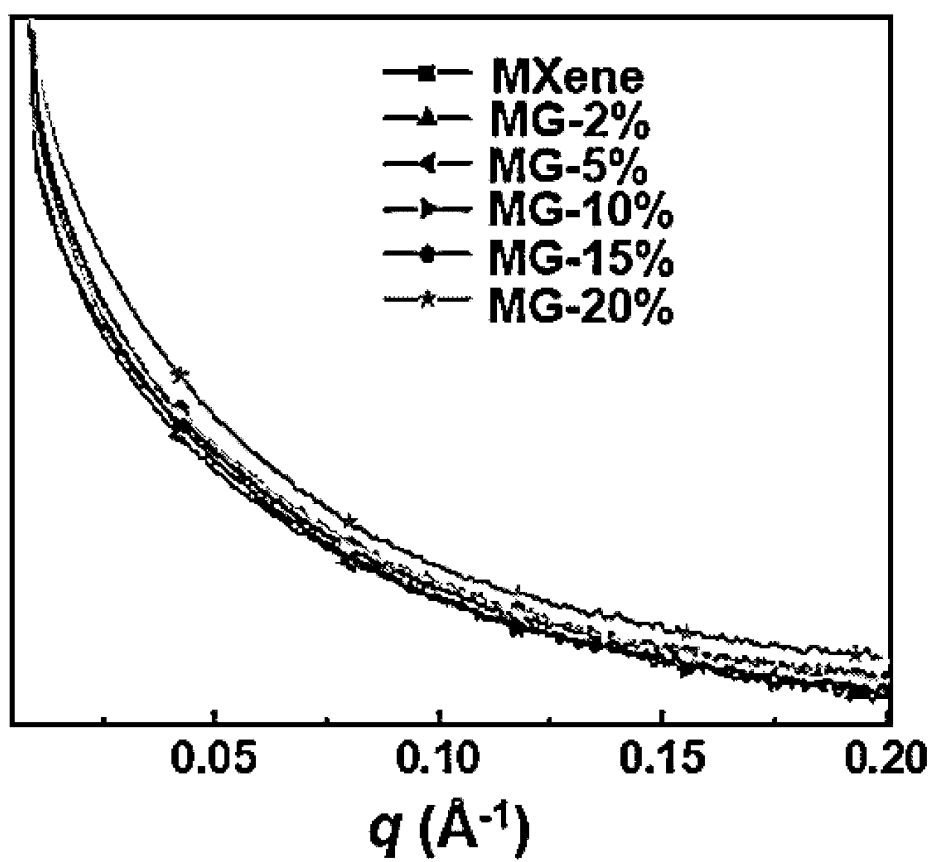


FIG. 17B

Intensity (a. u.)

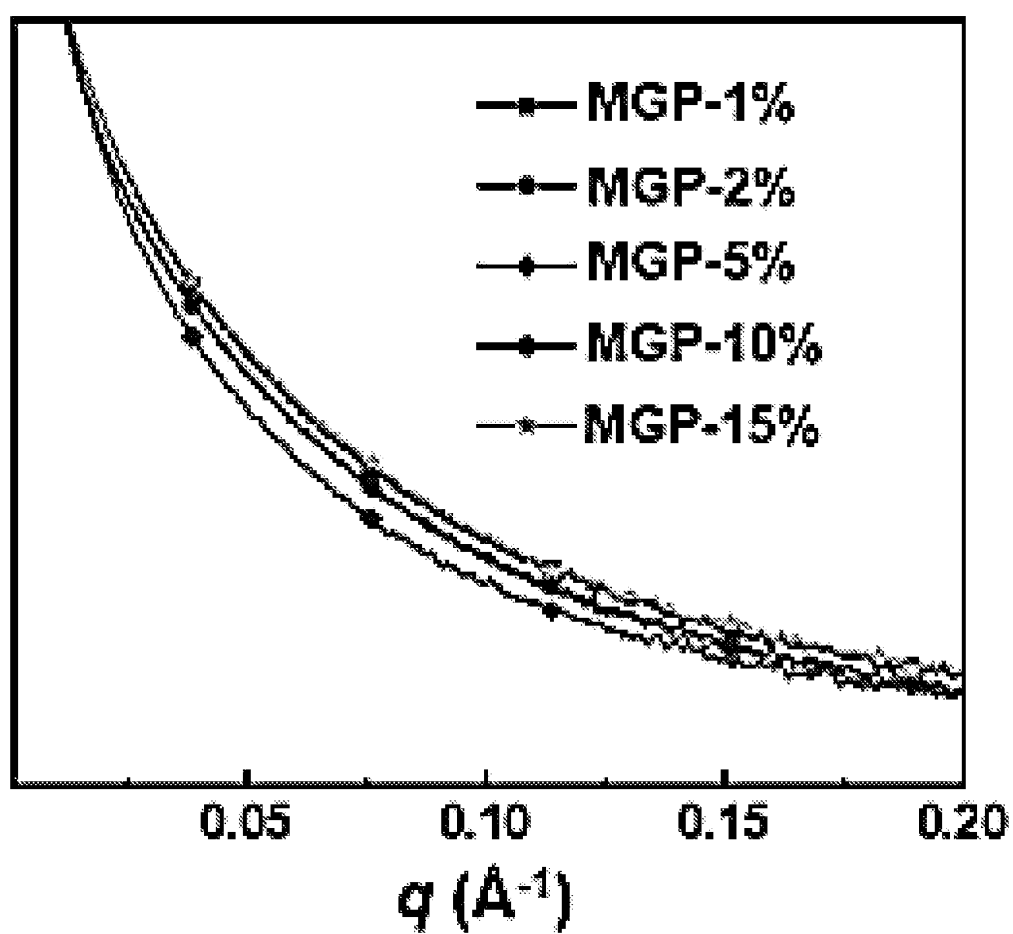


FIG. 17C

Intensity (a. u.)

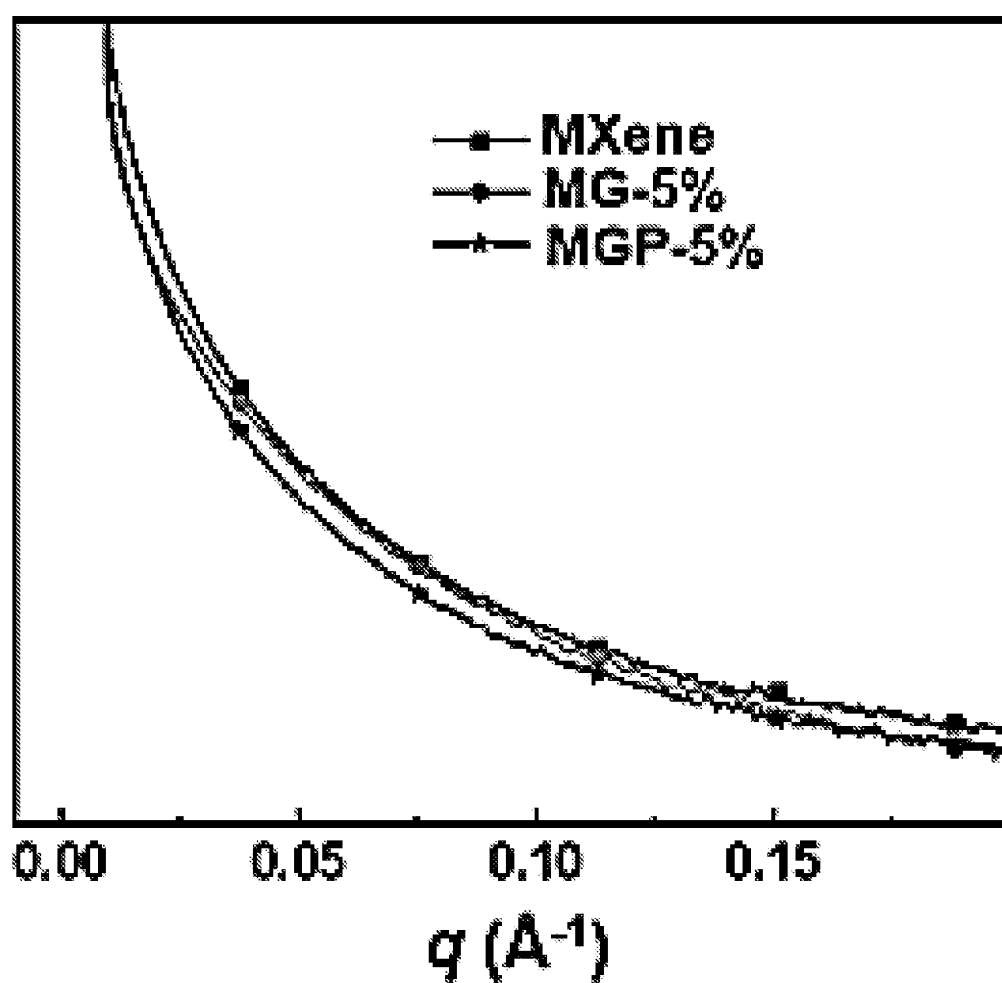


FIG. 18

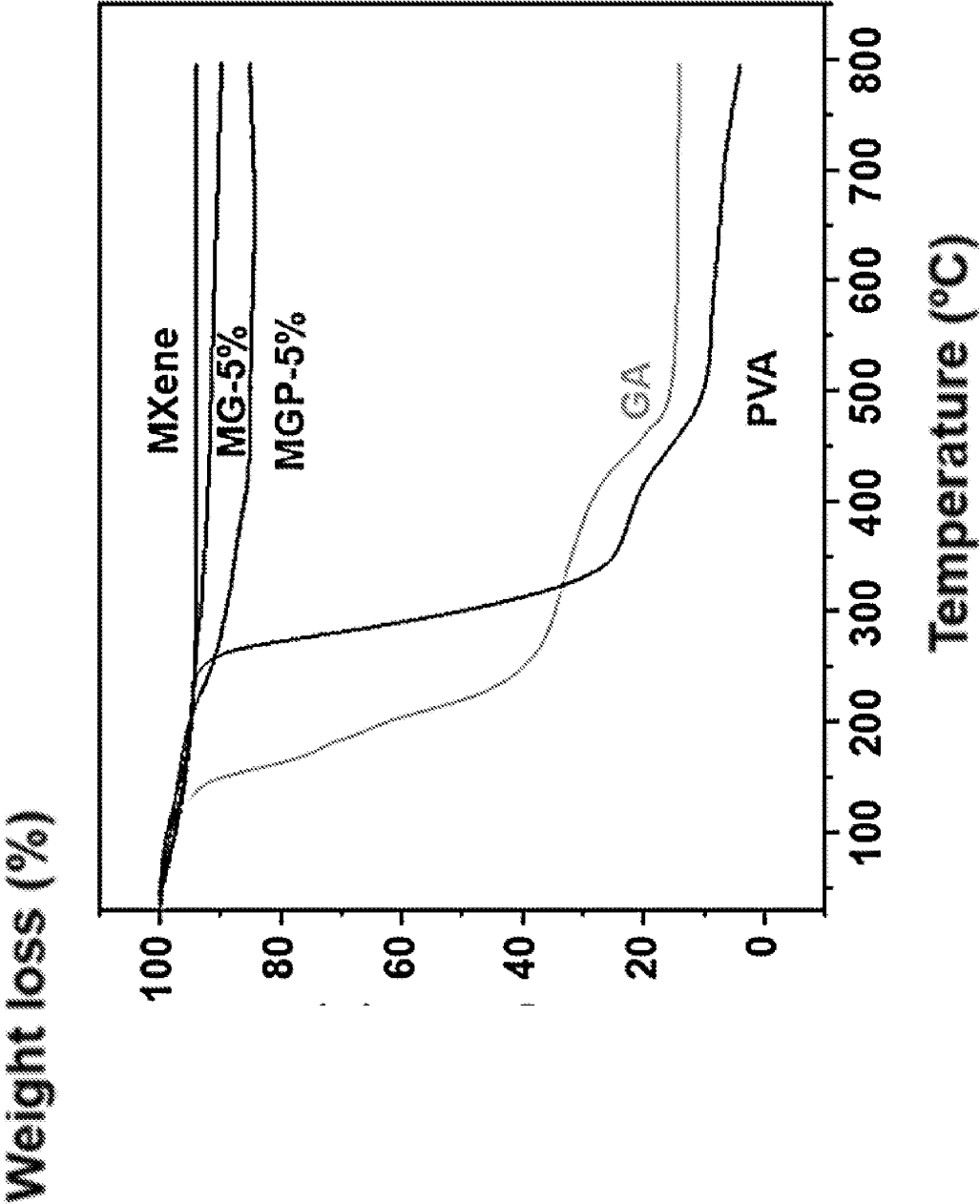


FIG. 19

Samples	Orientation order (f)	Porosity (%)
MXene	0.822	17.2 ± 3.84
MG-2%	0.832	15.9 ± 1.00
MG-5%	0.849	14.1 ± 1.99
MG-10%	0.831	15.5 ± 0.22
MG-15%	0.796	19.5 ± 3.09
MG-20%	0.717	25.6 ± 1.56

FIG. 20

Samples	Orientation order (f)	Porosity (%)
MG-5%	0.849	14.1 ± 1.99
MGP-1%	0.861	13.7 ± 2.33
MGP-2%	0.863	11.9 ± 3.30
MGP-5%	0.872	7.4 ± 1.27
MGP-10%	0.865	14.4 ± 3.60
MGP-15%	0.850	23.2 ± 3.06

FIG. 21

Samples	Tensile strengths (MPa)	Strain (%)	Toughness (MJ m ⁻³)
MXene	167.1 ± 7.2	0.5 ± 0.1	0.4 ± 0.1
MG-2%	202.4 ± 4.7	0.6 ± 0.1	0.7 ± 0.1
MG-5%	335.6 ± 3.8	2.0 ± 0.2	4.0 ± 0.7
MG-10%	249.4 ± 11.4	1.1 ± 0.1	1.8 ± 0.4
MG-15%	183.4 ± 4.3	0.9 ± 0.1	1.0 ± 0.1
MG-20%	92.6 ± 2.4	0.7 ± 0.02	0.3 ± 0.02

FIG. 22A

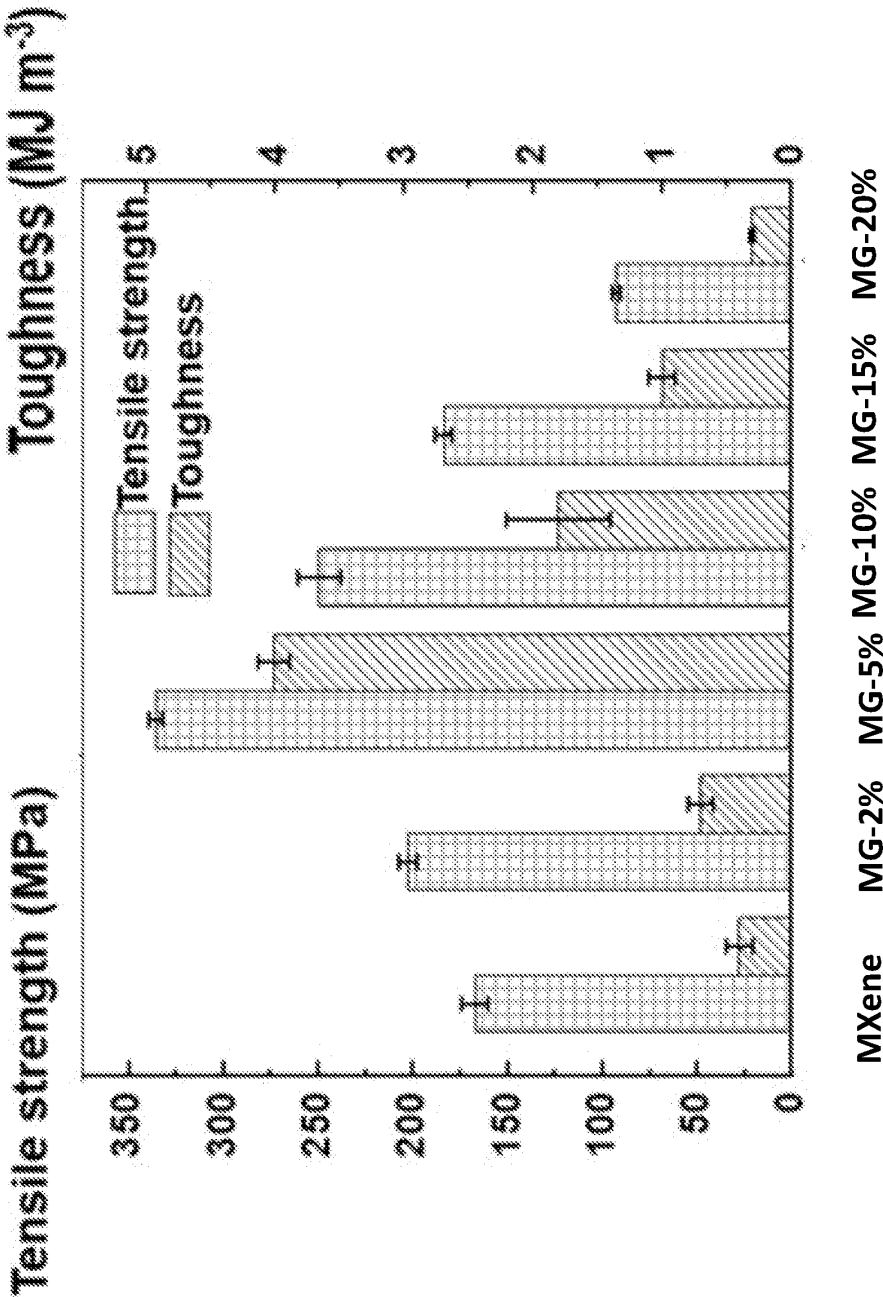


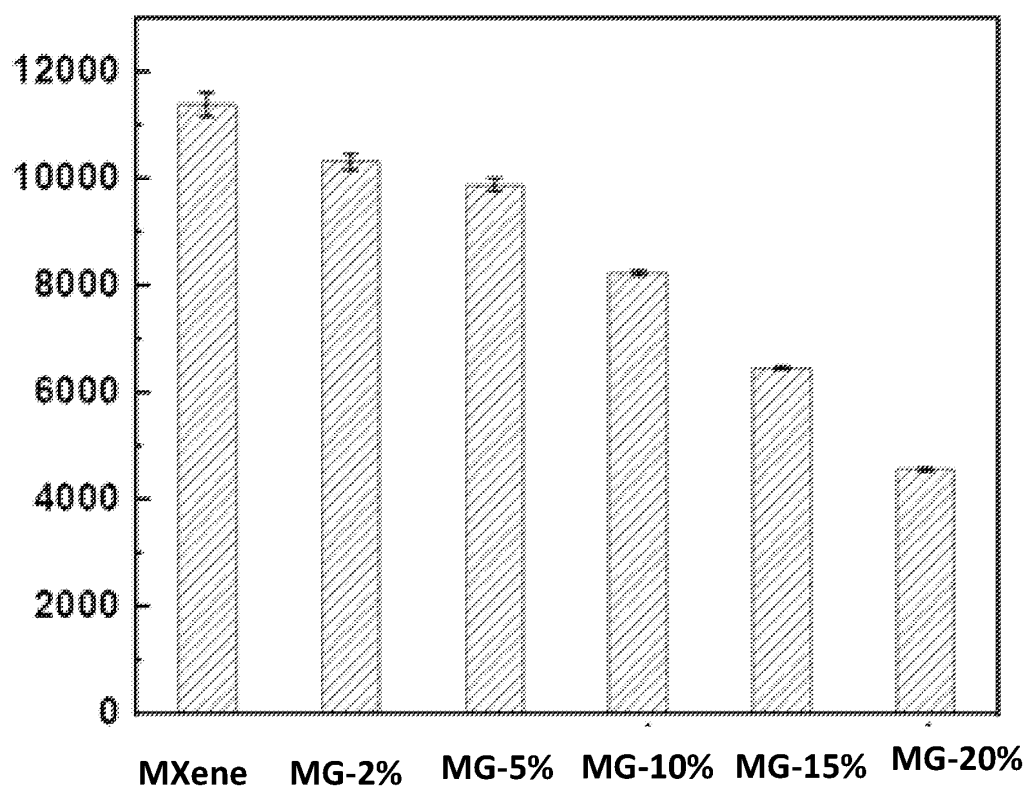
FIG. 22B**Conductivity (S cm^{-1})**

FIG. 23A

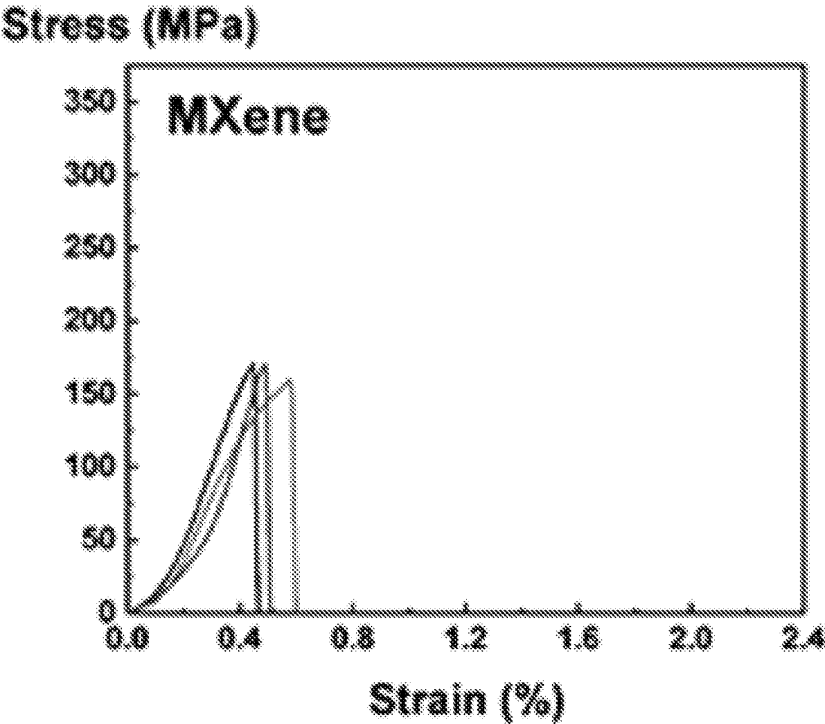


FIG. 23B

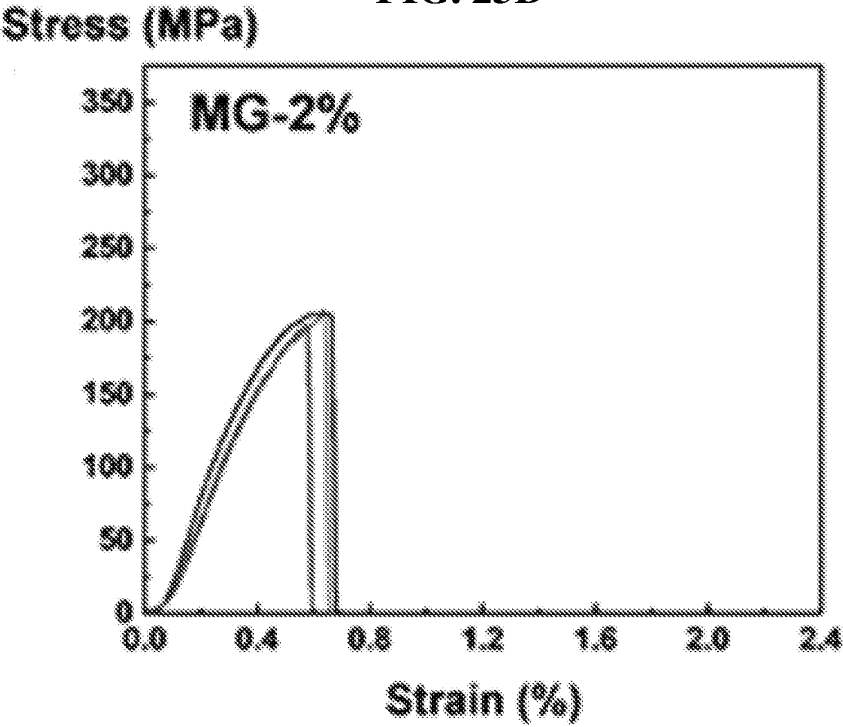


FIG. 23C

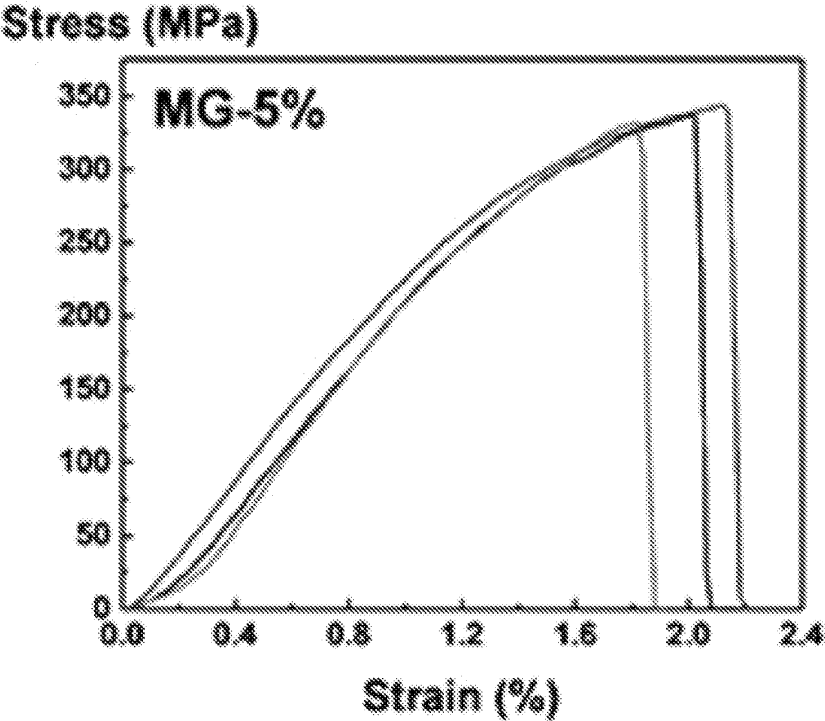


FIG. 23D

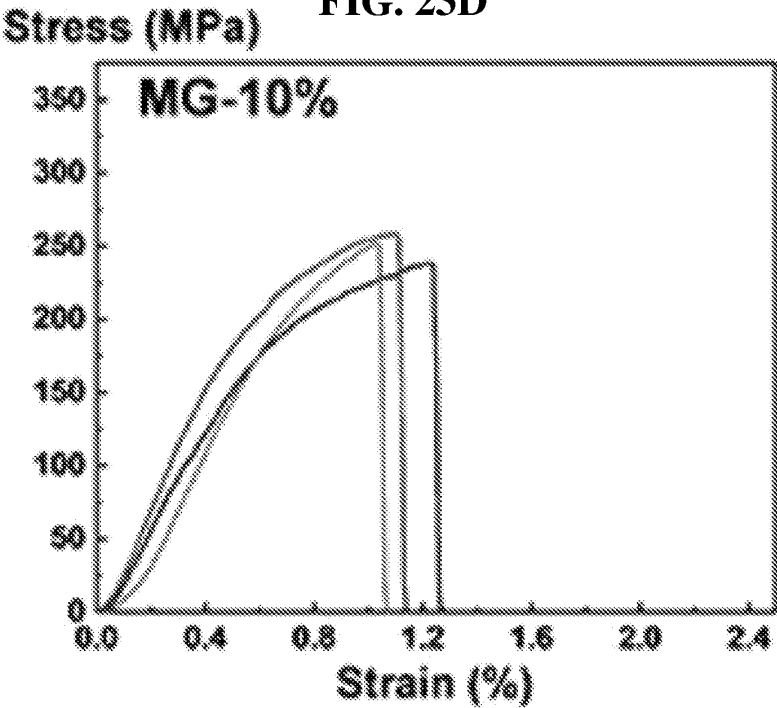


FIG. 23E

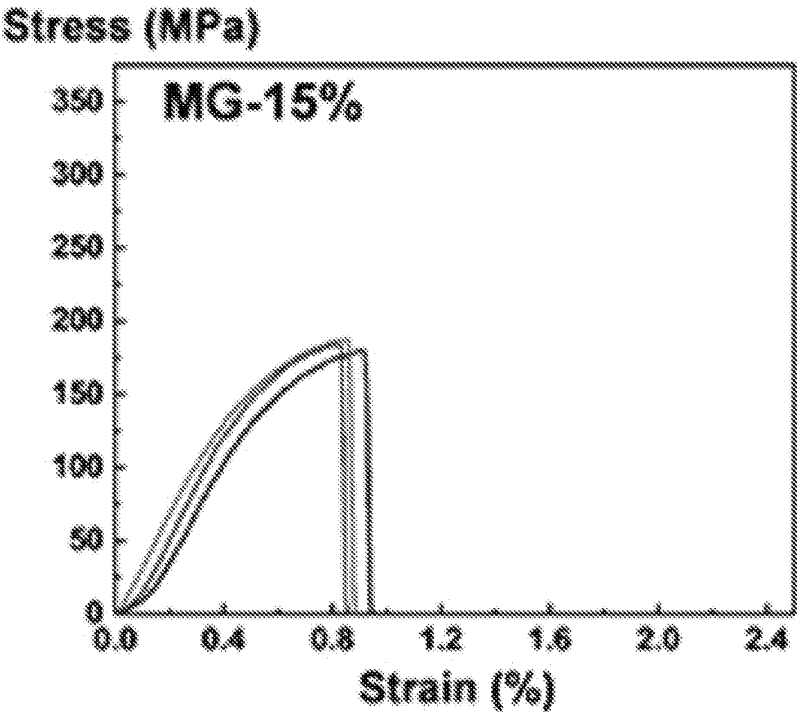


FIG. 23F

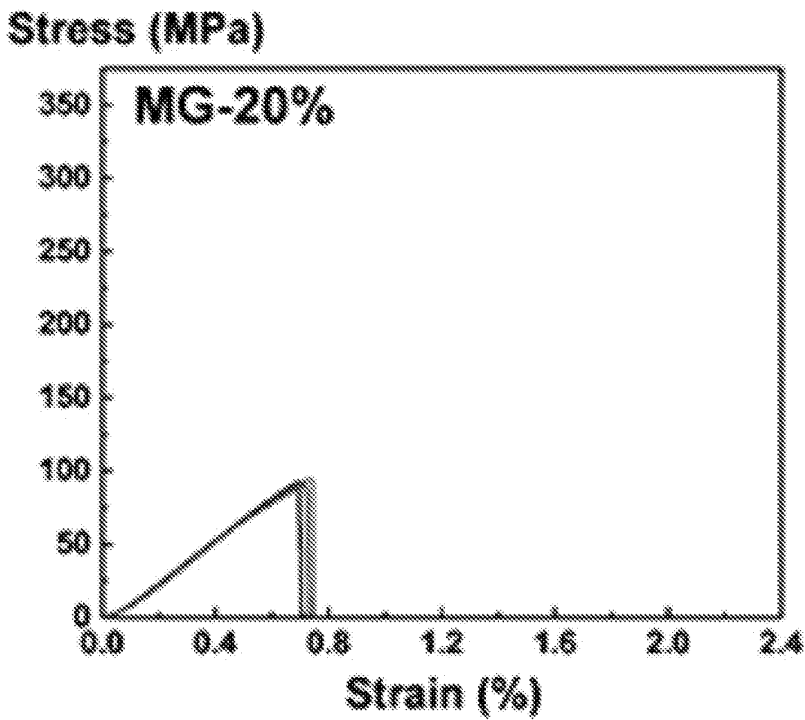
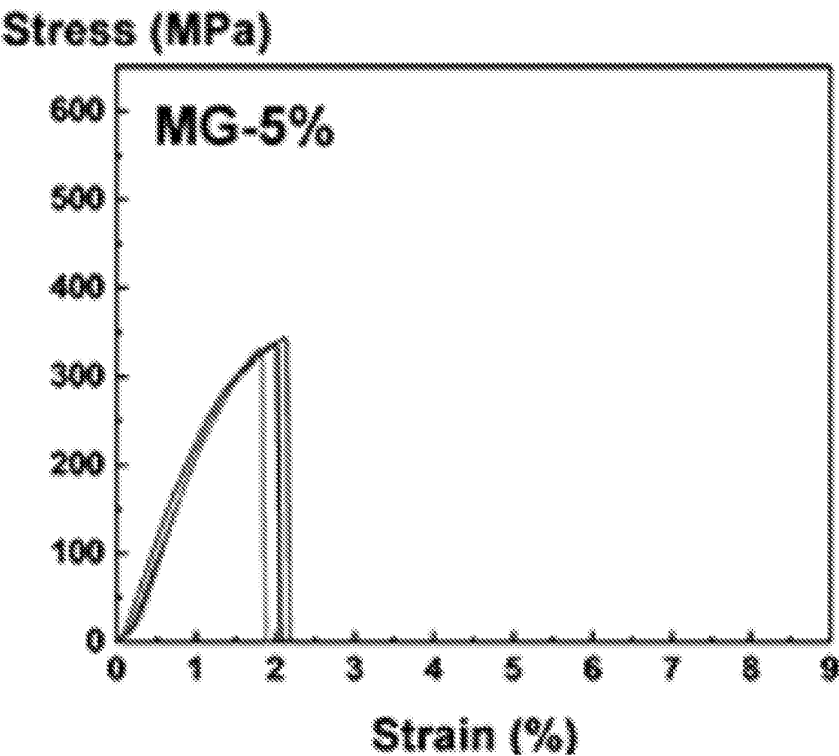


FIG. 24

Sample	Electrical conductivity (S cm ⁻¹)
MXene	11360.4 ± 227.2
MG-2%	10288.3 ± 144.0
MG-5%	9860.6 ± 117.5
MG-10%	8210.5 ± 46.2
MG-15%	6432.3 ± 18.6
MG-20%	4536.4 ± 30.8

FIG. 25A



Stress (MPa) FIG. 25B

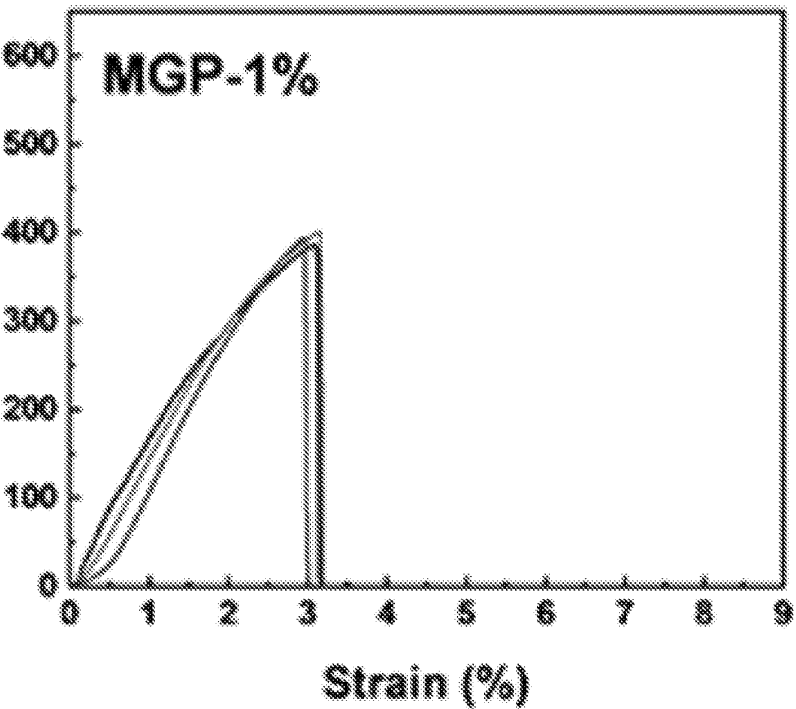


FIG. 25C

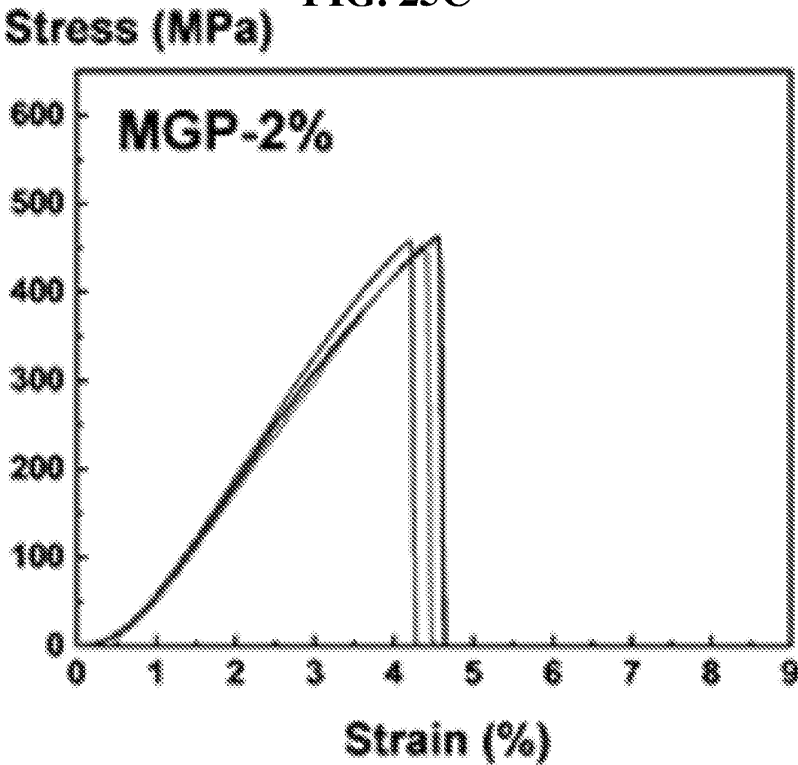


FIG. 25D

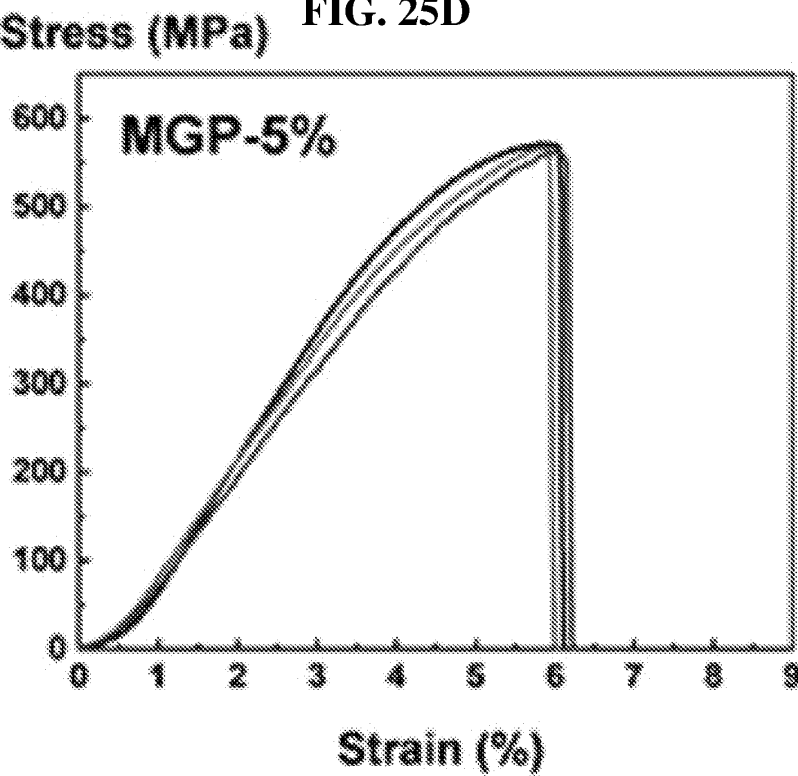


FIG. 25E

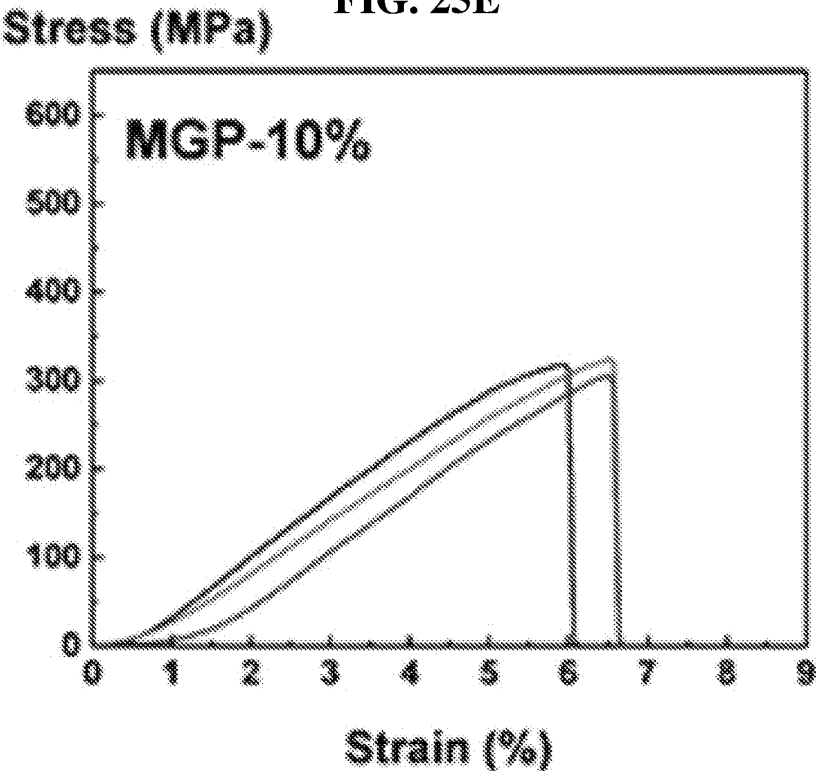


FIG. 25F

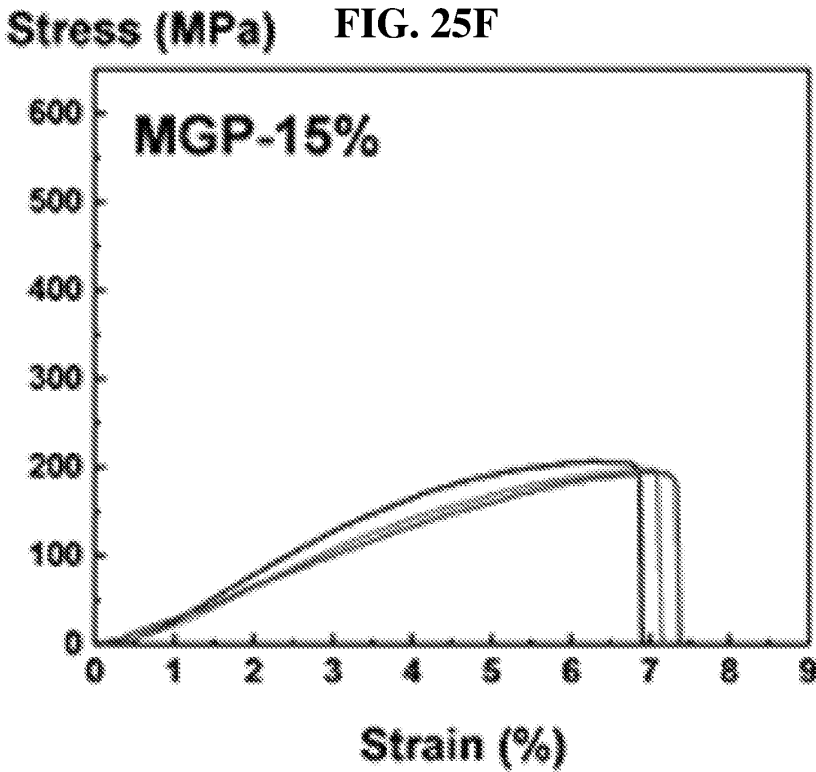


FIG. 25G

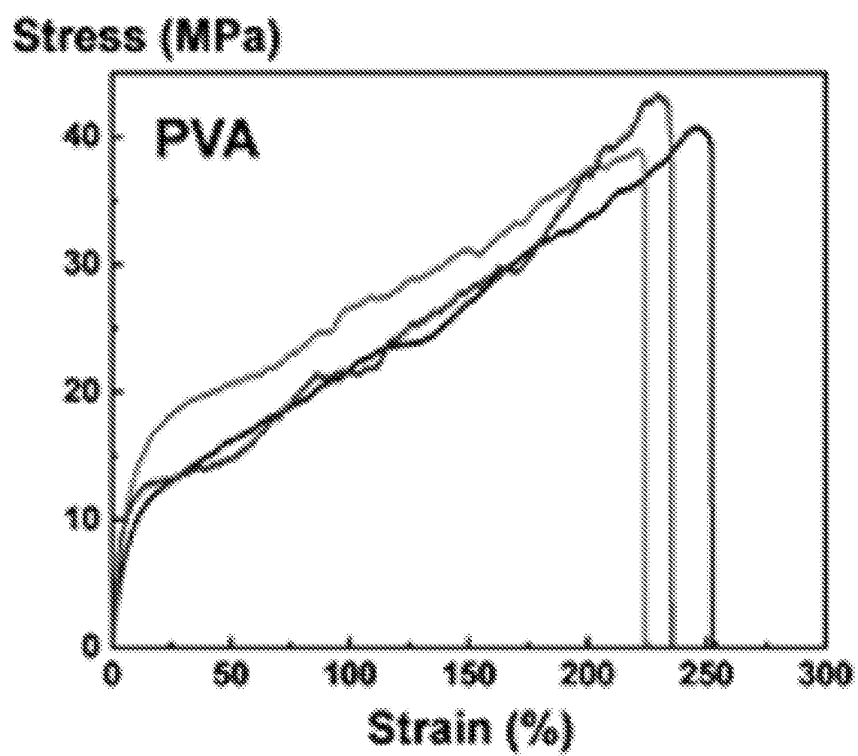


FIG. 26

Samples	Tensile strengths (MPa)	Strain (%)	Toughness (MJ m ⁻³)
MG-5%	335.6 ± 3.8	2.0 ± 0.2	4.0 ± 0.7
MGP-1%	393.6 ± 7.3	3.1 ± 0.1	6.6 ± 1.1
MGP-2%	458.3 ± 4.4	4.4 ± 0.2	9.4 ± 0.7
MGP-5%	565.2 ± 5.2	6.0 ± 0.1	19.2 ± 0.7
MGP-10%	315.6 ± 10.0	6.2 ± 0.3	9.7 ± 1.0
MGP-15%	196.0 ± 6.7	7.1 ± 0.3	8.4 ± 0.3
PVA	40.7 ± 2.2	235.3 ± 15.4	60.2 ± 2.2

FIG. 27
Conductivity ($\times 10^3 \text{ S cm}^{-1}$)

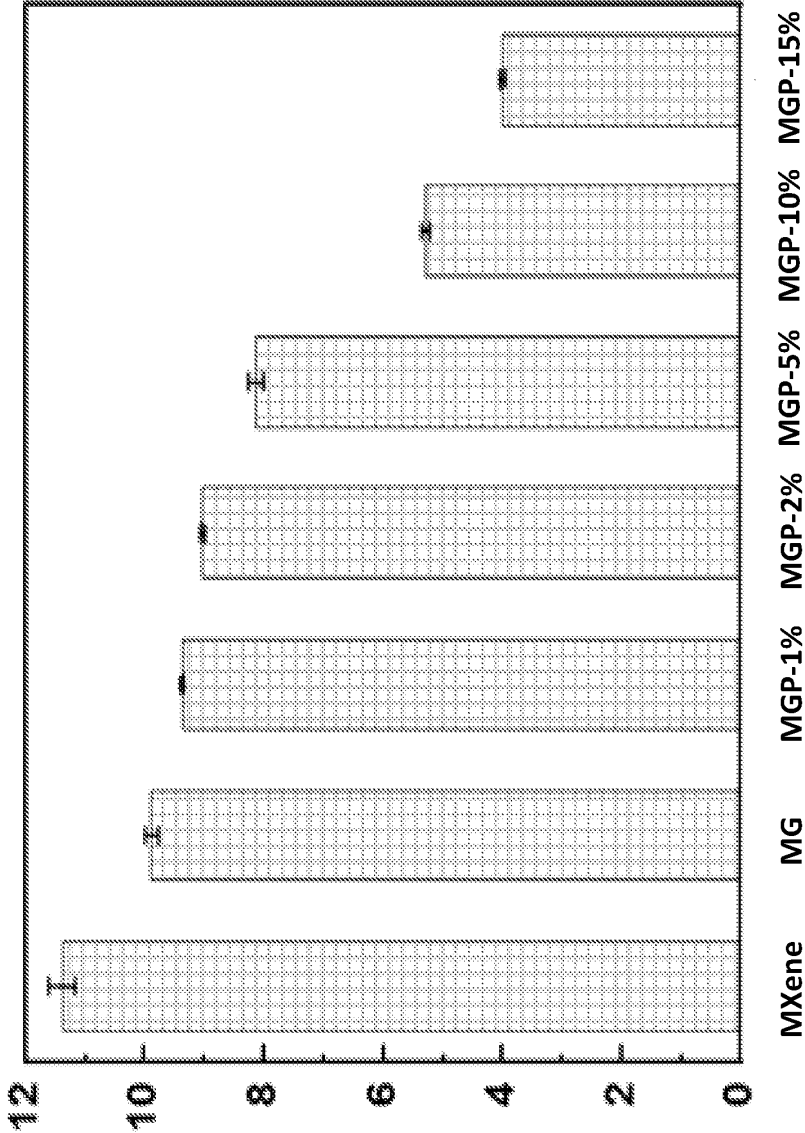


FIG. 28

Sample	Electrical conductivity (S cm ⁻¹)
MG-5%	9860.6 ± 117.5
MGP-1%	9350.3 ± 14.8
MGP-2%	9003.9 ± 34.9
MGP-5%	8110.4 ± 115.6
MGP-10%	5258.7 ± 66.0
MGP-15%	3966.8 ± 40.3

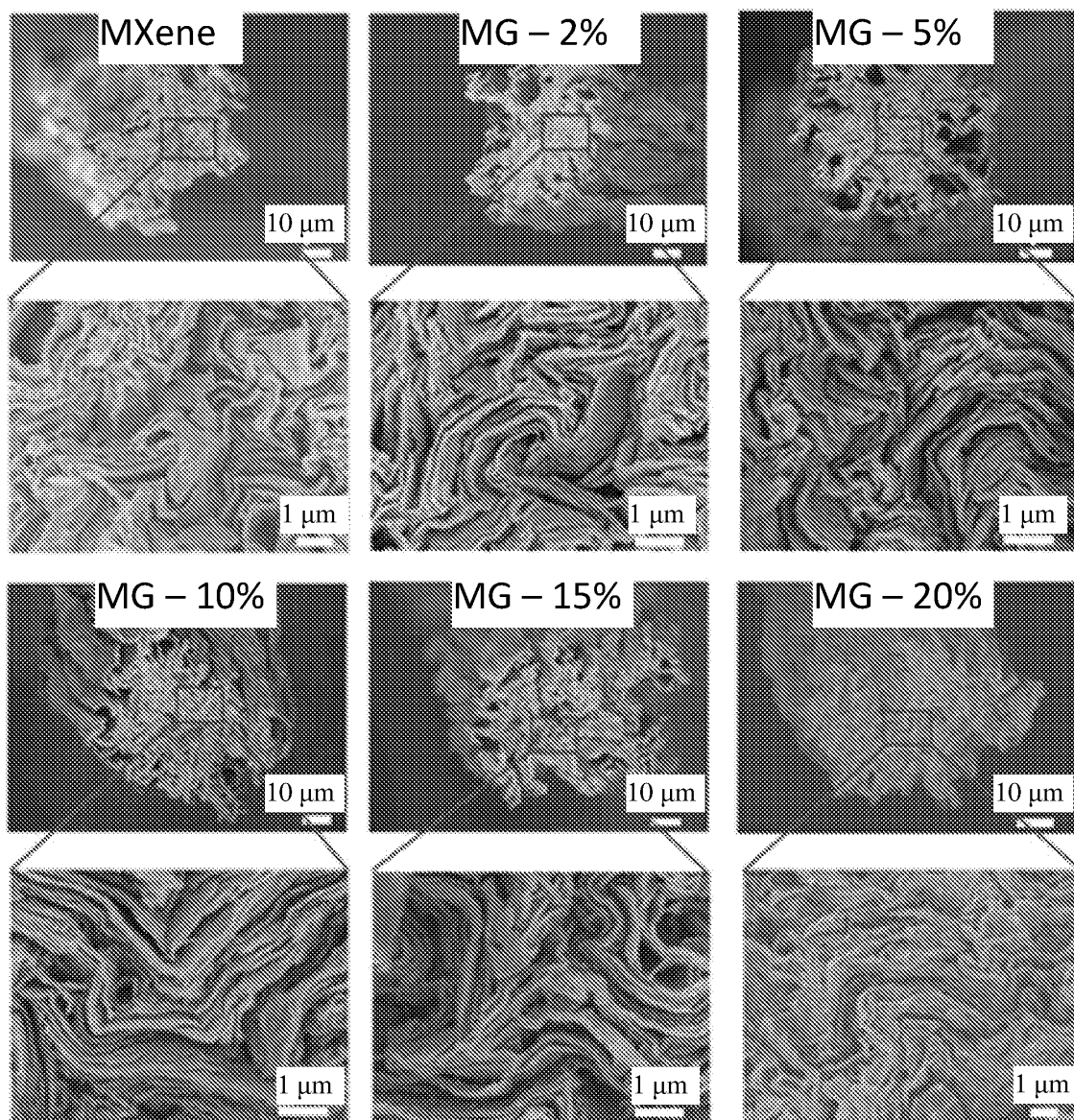
FIG. 29

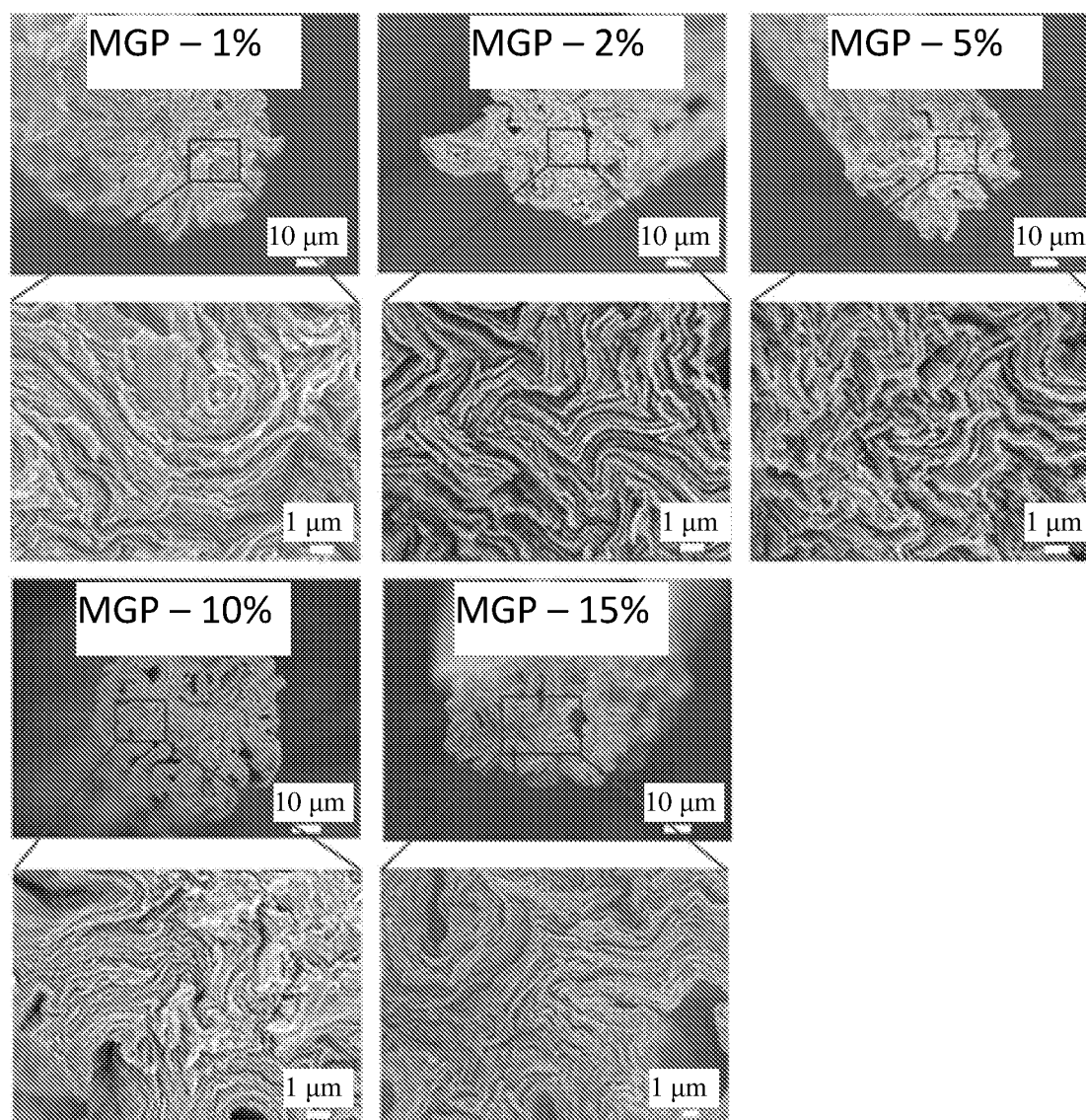
FIG. 30

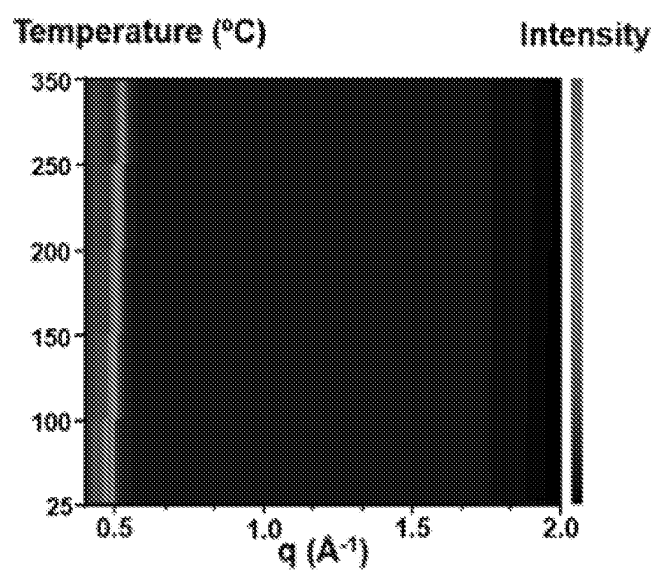
FIG. 31A

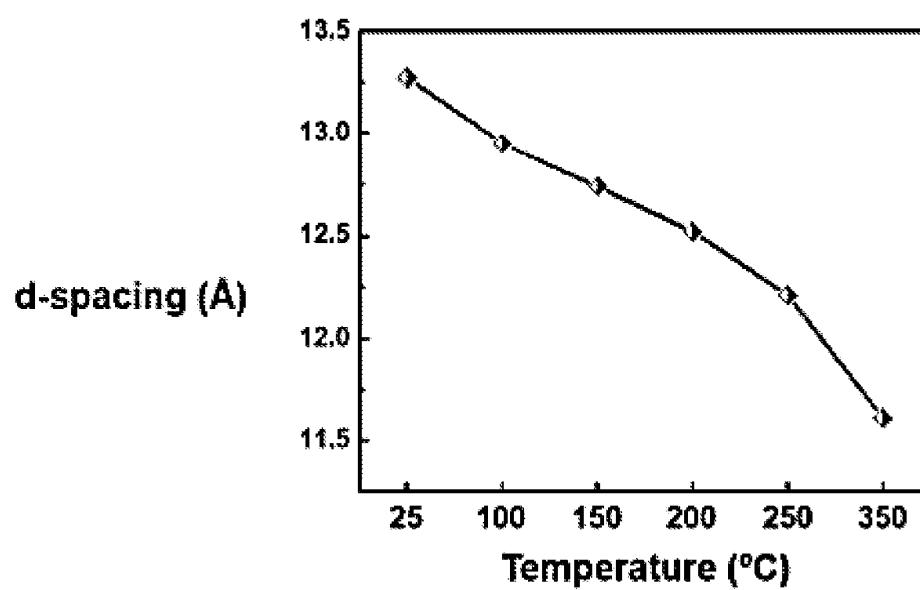
FIG. 31B

FIG. 31C

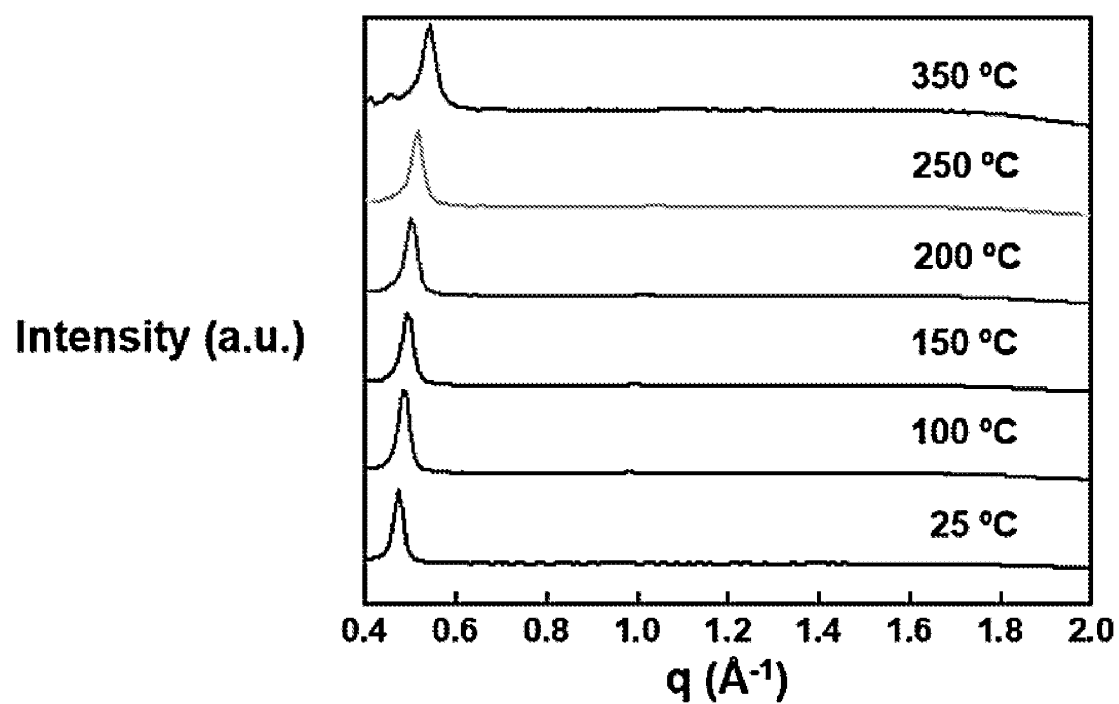


FIG. 31D

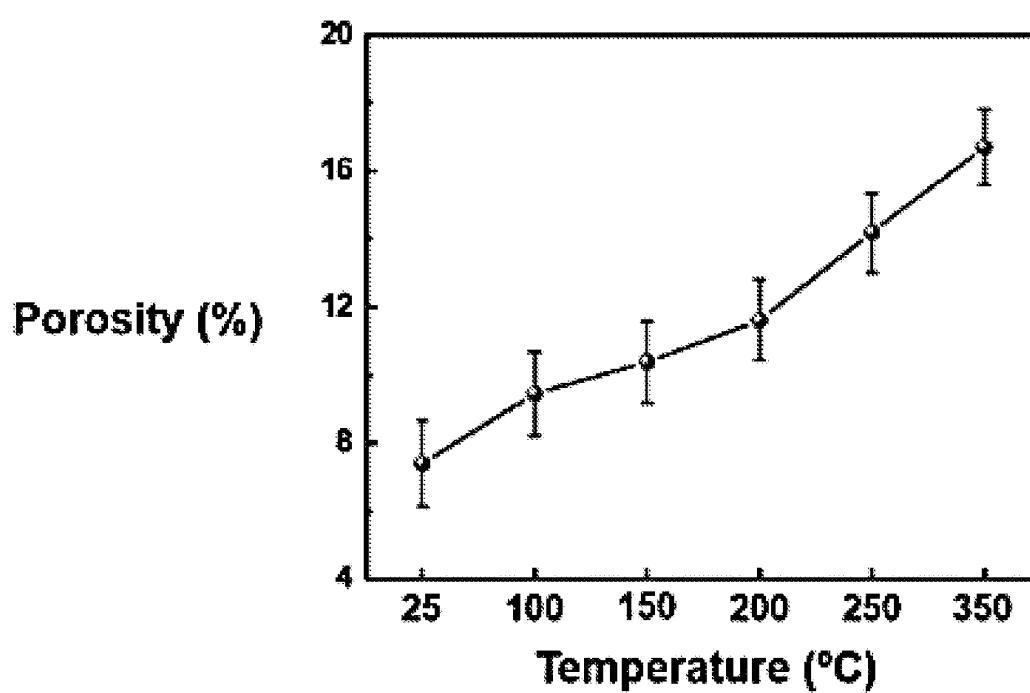


FIG. 32A

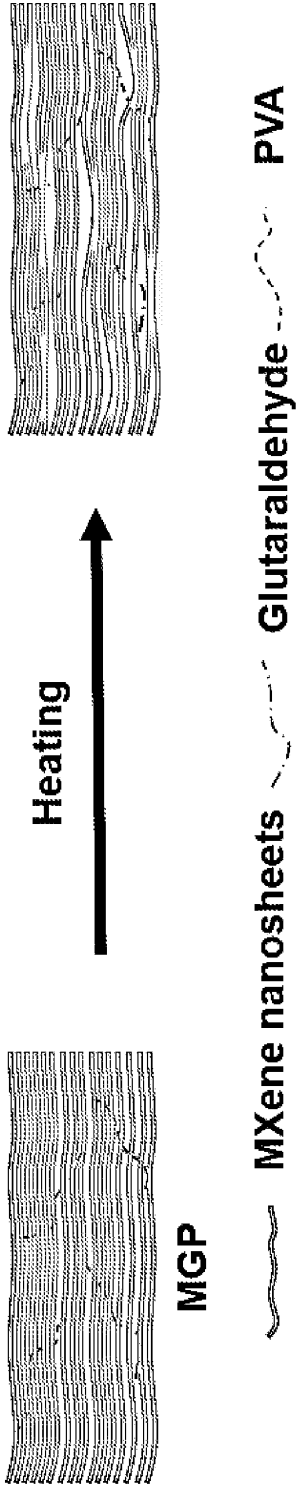


FIG. 32B

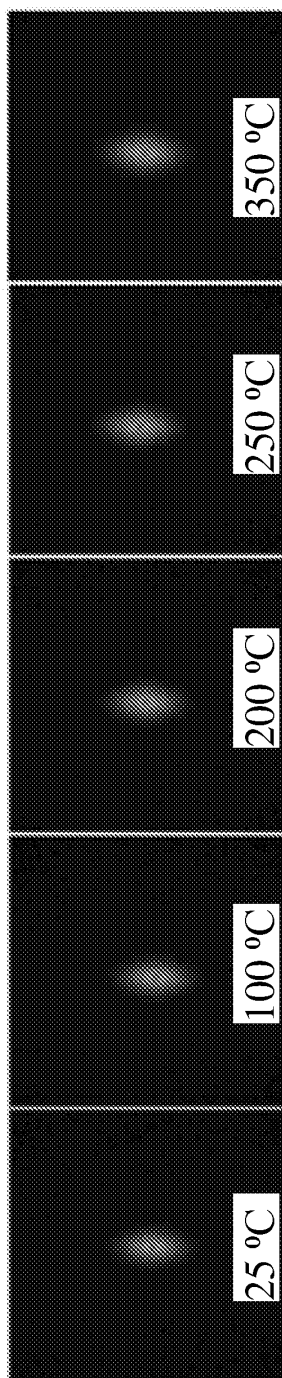


FIG. 32C

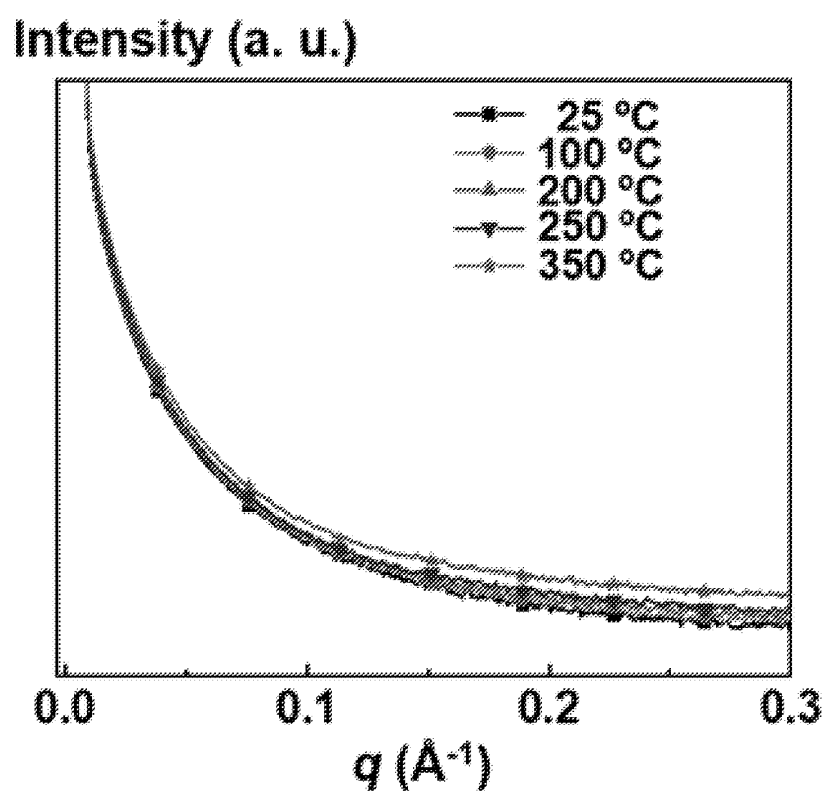


FIG. 33A

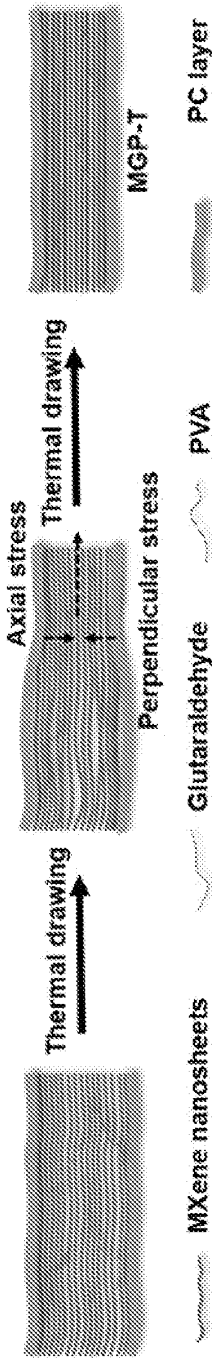


FIG. 33B

measuring tape

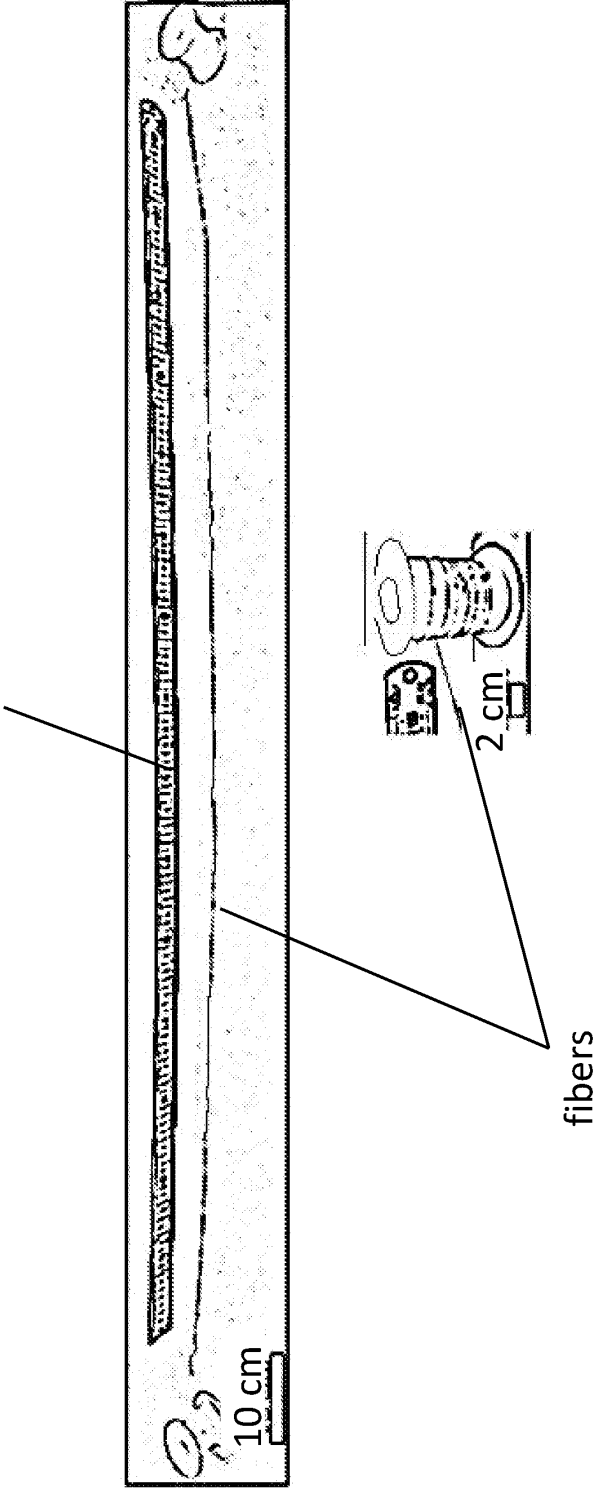


FIG. 33C

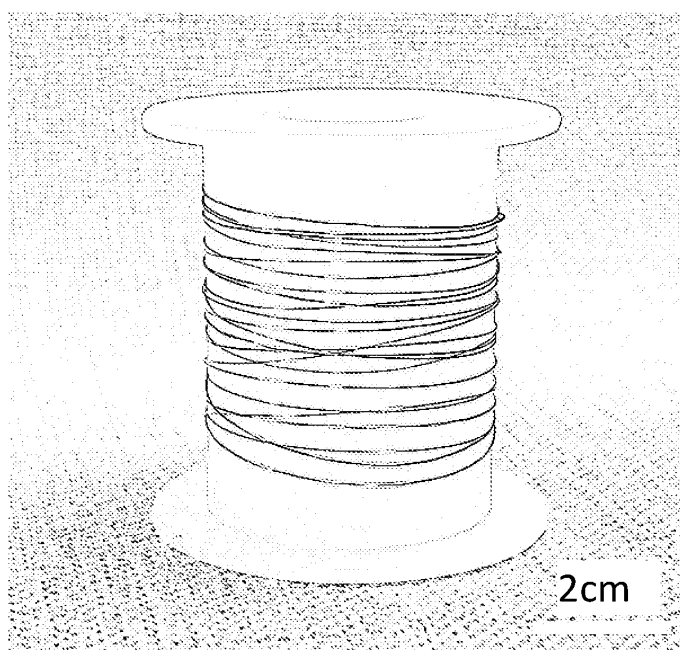


FIG. 34A

Orientation order (f)

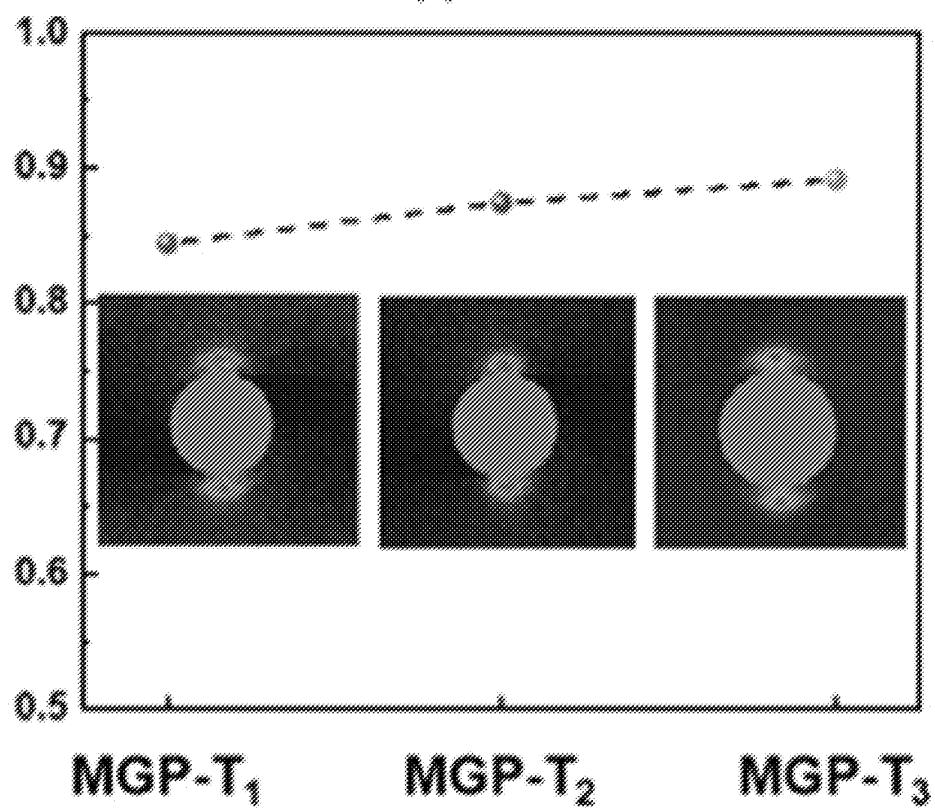


FIG. 34B

Intensity (a.u.)

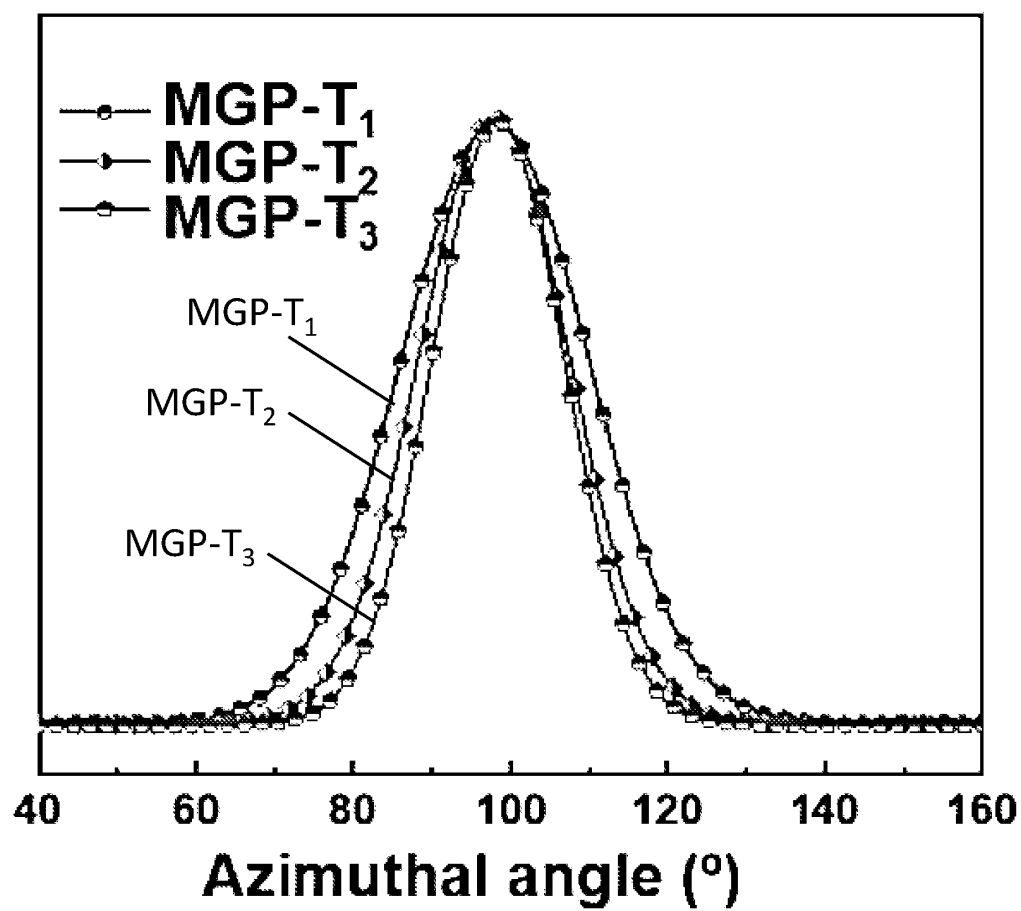


FIG. 34C

Samples	Orientation order (f)	Porosity (%)
MGP-T ₁	0.844	8.6 ± 0.1
MGP-T ₂	0.874	7.2 ± 0.1
MGP-T ₃	0.891	5.7 ± 0.3

FIG. 35A

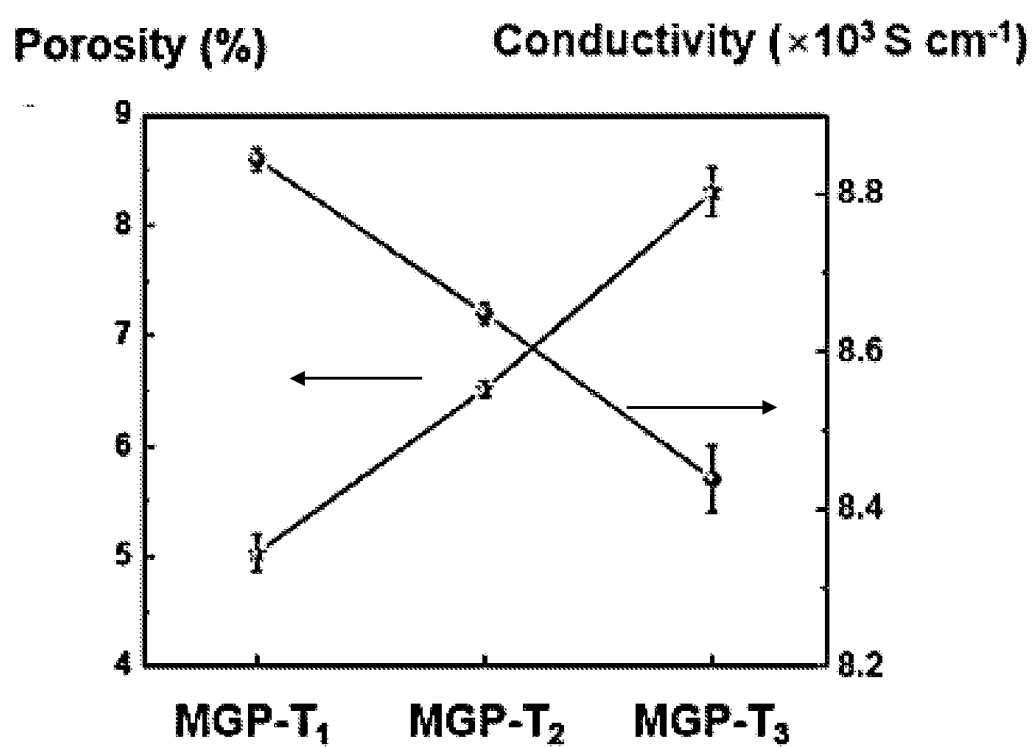


FIG. 35B

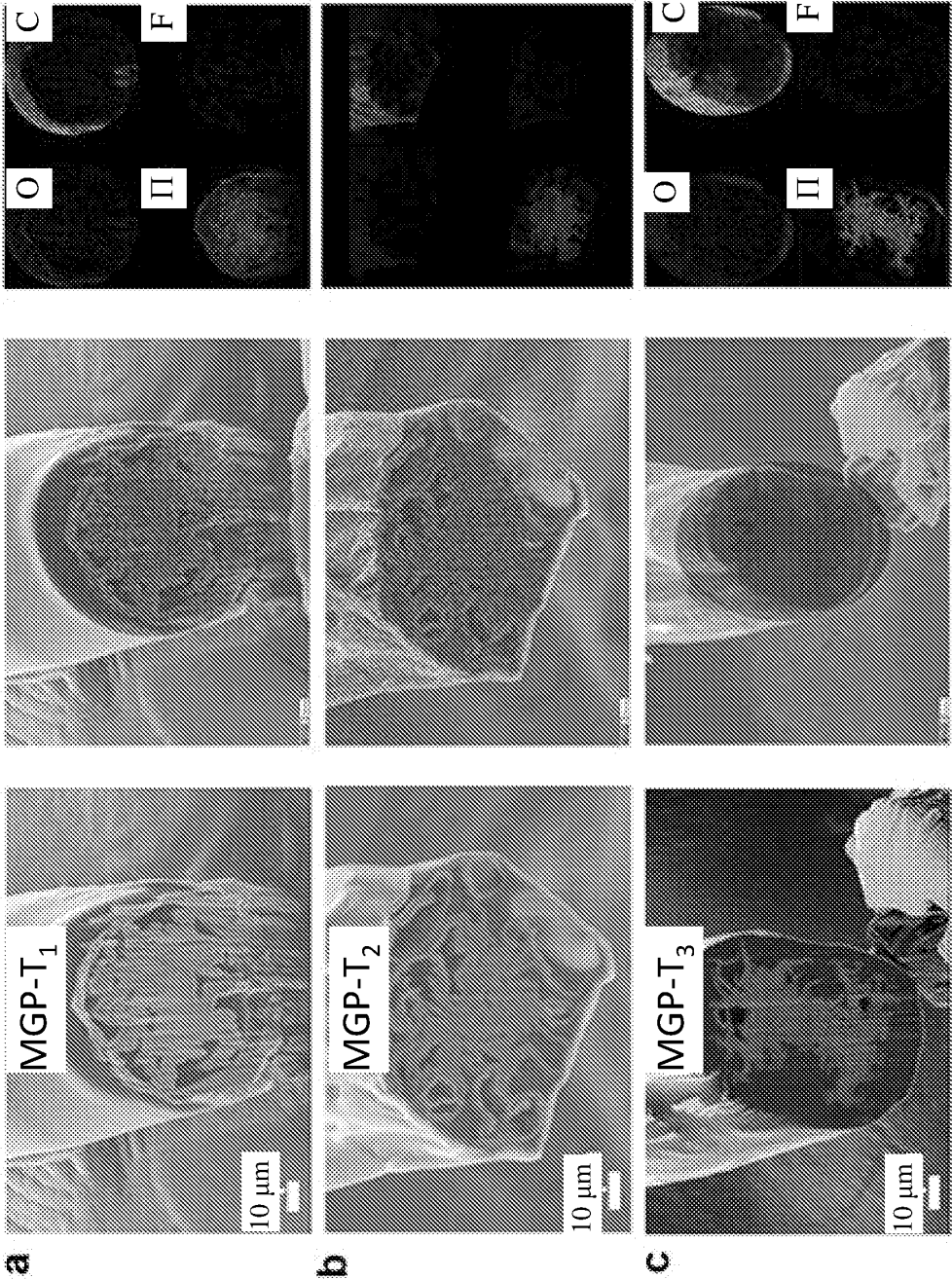


FIG. 36A

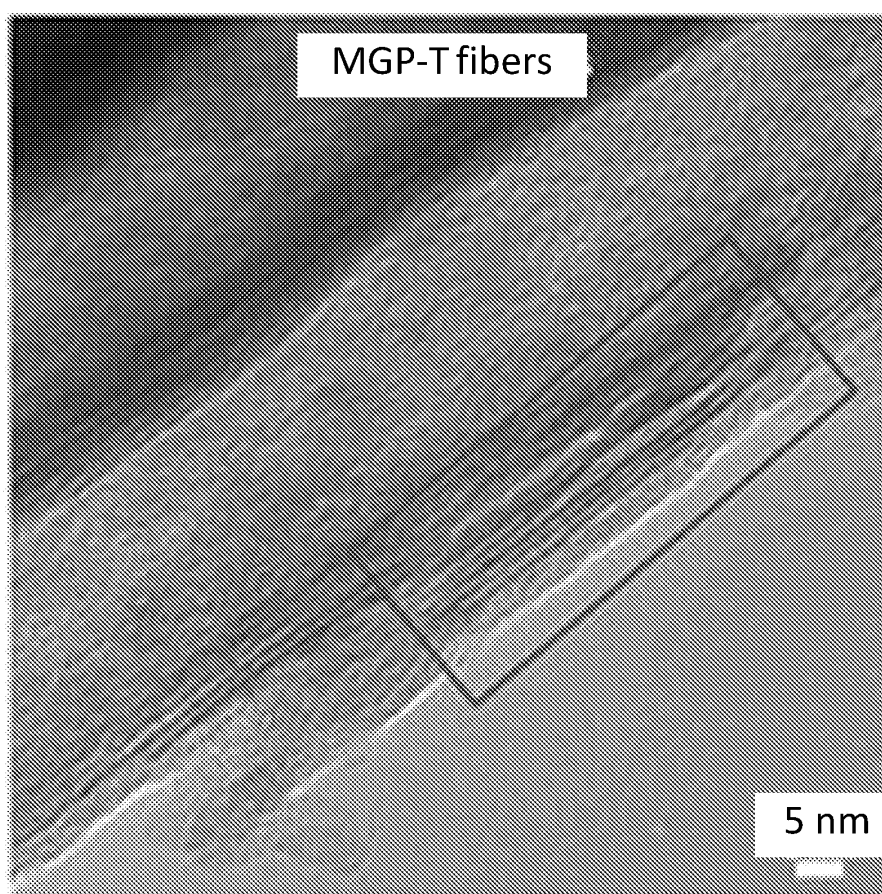


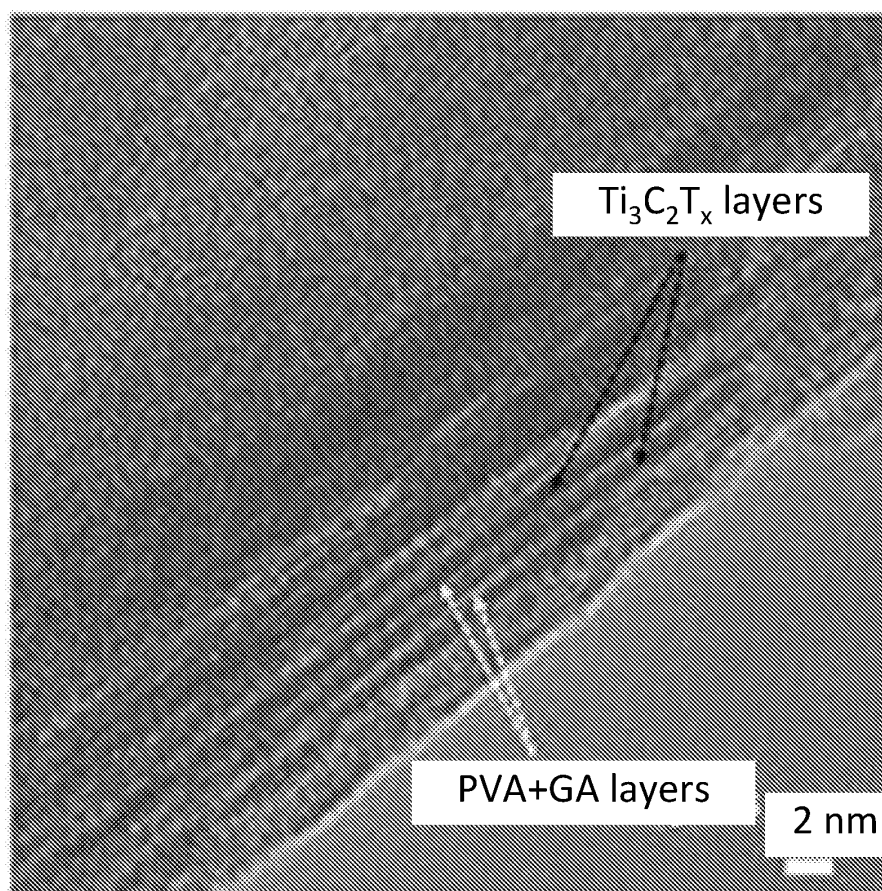
FIG. 36B

FIG. 36C

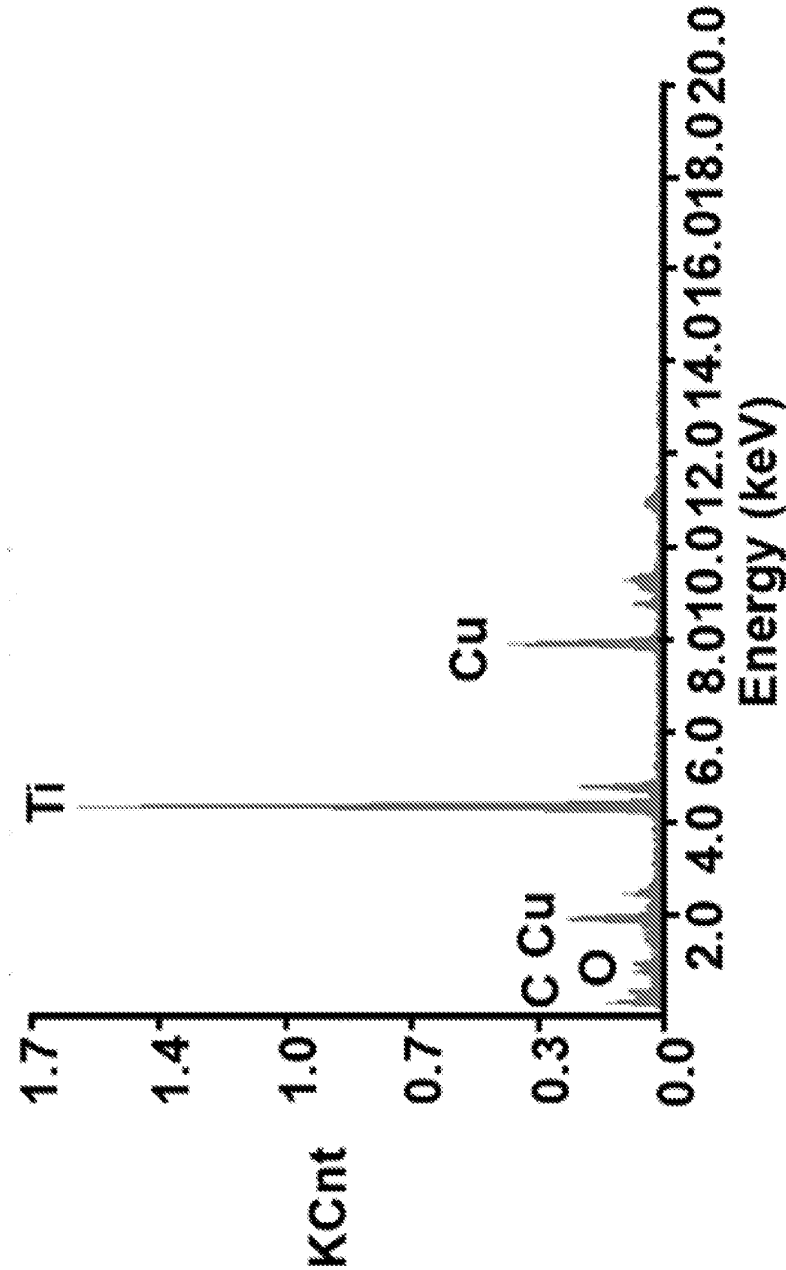


FIG. 37

Sample	Electrical conductivity (S cm ⁻¹)
MGP-T ₁	8344.5 ± 23.4
MGP-T ₂	8555.2 ± 10.4
MGP-T ₃	8802.4 ± 30.8

FIG. 38A

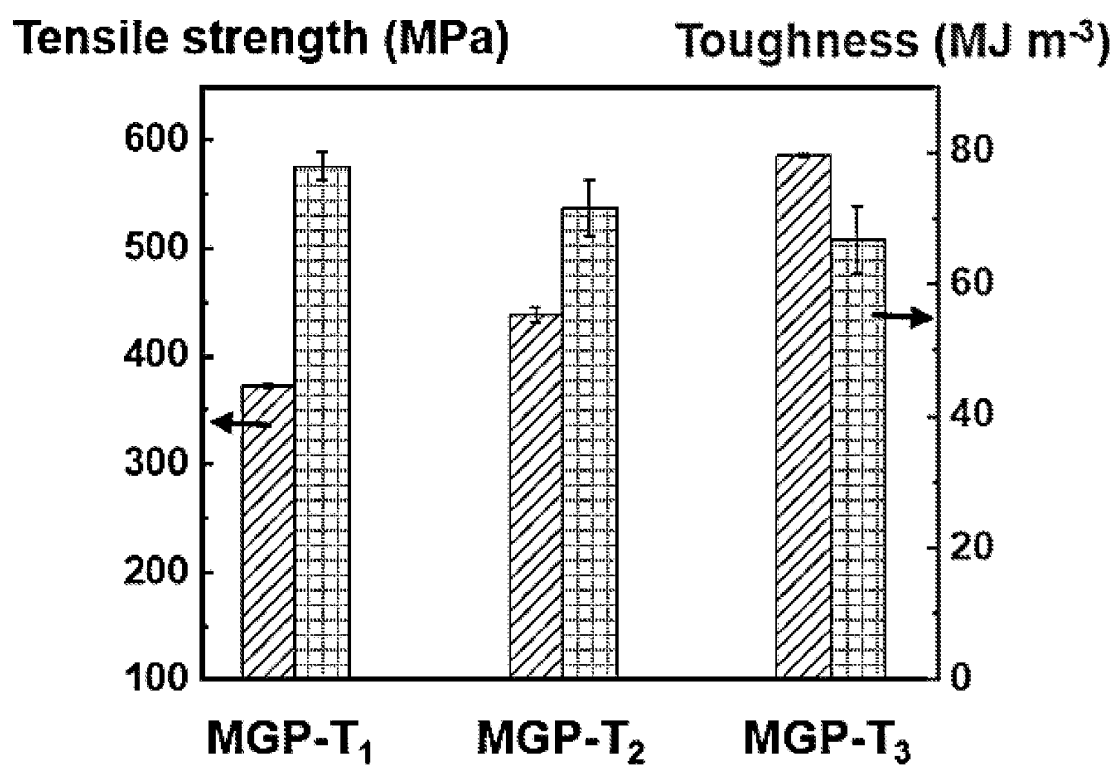


FIG. 38B

Samples	Tensile strengths (MPa)	Strain (%)	Toughness (MJ m ⁻³)
PC	72.3 ± 3.7	44.1 ± 1.1	26.9 ± 0.9
MGP-T ₁	372.5 ± 1.6	26.0 ± 0.5	77.9 ± 2.1
MGP-T ₂	437.9 ± 6.5	21.4 ± 0.3	71.5 ± 4.3
MGP-T ₃	585.5 ± 2.1	18.0 ± 0.5	66.7 ± 5.0

FIG. 39A

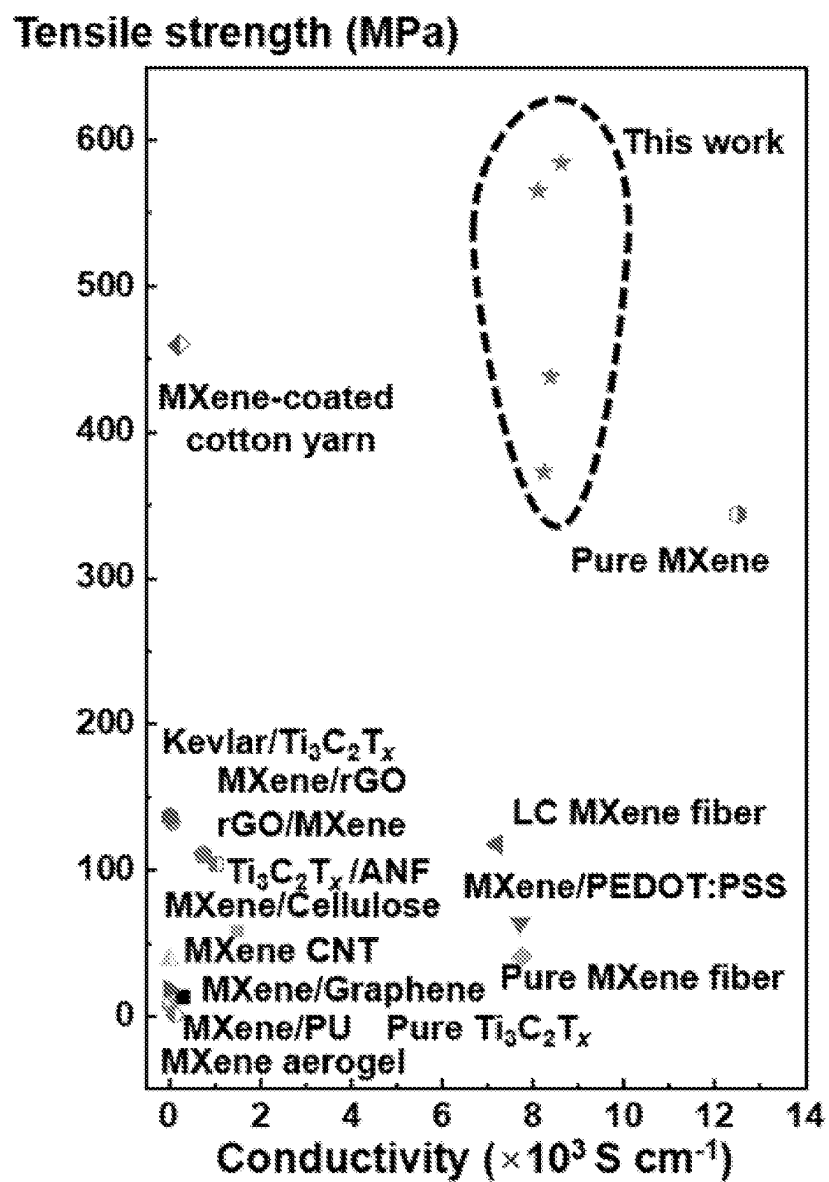


FIG. 39B

Fibers	Fabrication method	Tensile strength (MPa)	Toughness (MJ m ⁻³)	Conductivity (S cm ⁻¹)	Protective layer	Ref. No.
MXene/Graphene	Wet spinning	12.9	~0.2	290	No	43
MXene/rGO	Wet spinning	132.5	~0.3	72.3	No	44
MXene/PEDOT:PSS	Wet spinning	58.1	~0.3	1489.8	No	45
Pure MXene Fiber	Wet spinning	63.9	~0.1	7713	No	7
LC MXene fiber	Wet spinning	40.5	~0.4	7750	No	15
Pure Ti ₃ C ₂ T _x	Wet spinning	118	~1.0	7200	No	26
Kevlar/Ti ₃ C ₂ T _x	Wet spinning	18	~0.3	0.01128	No	21
MXene/Cellulose	Wet spinning	136.5	~3.4	4.8	No	20
Pure MXene	Wet spinning	343.68	~0.5	12503.78	No	25
rGO/MXene	Wet spinning	110.7	3.8	743.1	No	46
MXene/PU	Wet spinning	7.8	-	1	No	47
Ti ₃ C ₂ T _x /ANF	Wet spinning	104	~4.1	1025	No	37
MXene Aerogel	Wet spinning	~1.0	~0.01	117.09	No	48
MXene/CNT	Biscrolling	38.4	~1.0	2.7	No	49
MXene/PEDOT:PSS-coated carbon tow	Coating	~3000	-	~198	No	17
MXene-coated cotton yarn	Coating	460	-	199	No	17
MGP	Wet spinning	565.2	19.2	8110.4	No	This work
MGP-T ₁	Wet spinning/Thermal drawing	372.5	77.9	8344.5	Yes	This work
MGP-T ₂	Wet spinning/Thermal drawing	437.9	71.5	8555.2	Yes	This work
MGP-T ₃	Wet spinning/Thermal drawing	585.5	66.7	8802.4	Yes	This work

FIG. 40A

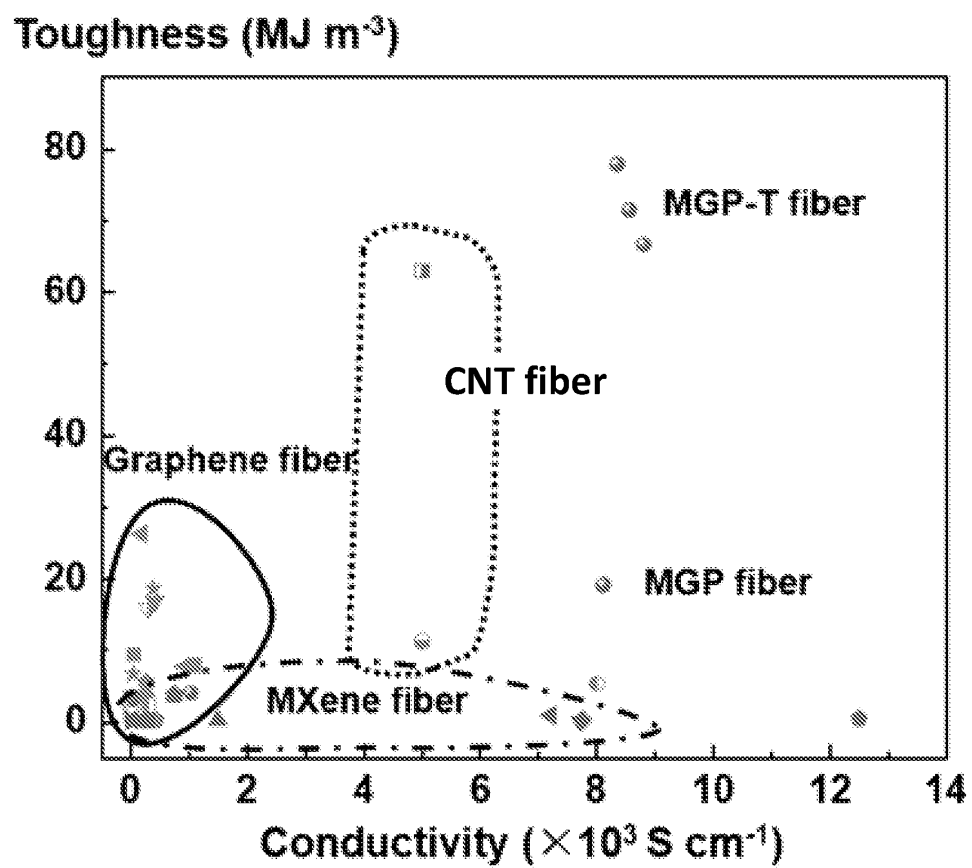


FIG. 40B

Fibers	Tensile strength (MPa)	Toughness (MJ m ⁻³)	Conductivity (S cm ⁻¹)	Protective layer	Ref. No.
rGG-Ca ²⁺	501.5	16.8	410	No	S1
rGO-NaOH	140.0	3.9	250	No	S2
rGO-Ag-NW	300.0	7.8	930	No	S3
Porous rGO fiber	50.0	0.3	25.1	No	S4
Writing rGO	350.0	5.6	270	No	S5
LGO-SA	784.9	6.8	35.8	No	S6
Dry film scrolled	40.0	0.3	416	No	S7
rGO-chitosan	115.0	1.4	2.8	No	S8
rGO-CTAB	175.0	3.2	35.0	No	S9
CRG-PVA	160.0	2.9	3.5	No	S10
rGO-HPG	165.0	1.2	4.9	No	S11
rGO-NaDC	238.0	2.4	308	No	S12
rGO-Ca ²⁺ -PCDO	842.0	15.8	292.4	No	S13
RGG-HPG-HI	487.0	9.5	52.0	No	S14
BGNF	740.1	18.7	384.3	No	S15
rGO-CS-Ca ²⁺	743.6	26.3	179.0	No	S16
Graphene fiber	~1100	~8	1100	No	6
GF	1450	~5.4	8000	No	24
Twisted MWNY fiber	~300	~11.3	5000	No	8
Multilayered CNT fiber	~700	~63	5000	No	S17
MGP	565.2	19.2	8110.4	No	This work
MGP-T ₁	372.5	77.9	8344.5	Yes	This work
MGP-T ₂	437.9	71.5	8555.2	Yes	This work
MGP-T ₃	585.5	66.7	8802.4	Yes	This work

FIG. 41

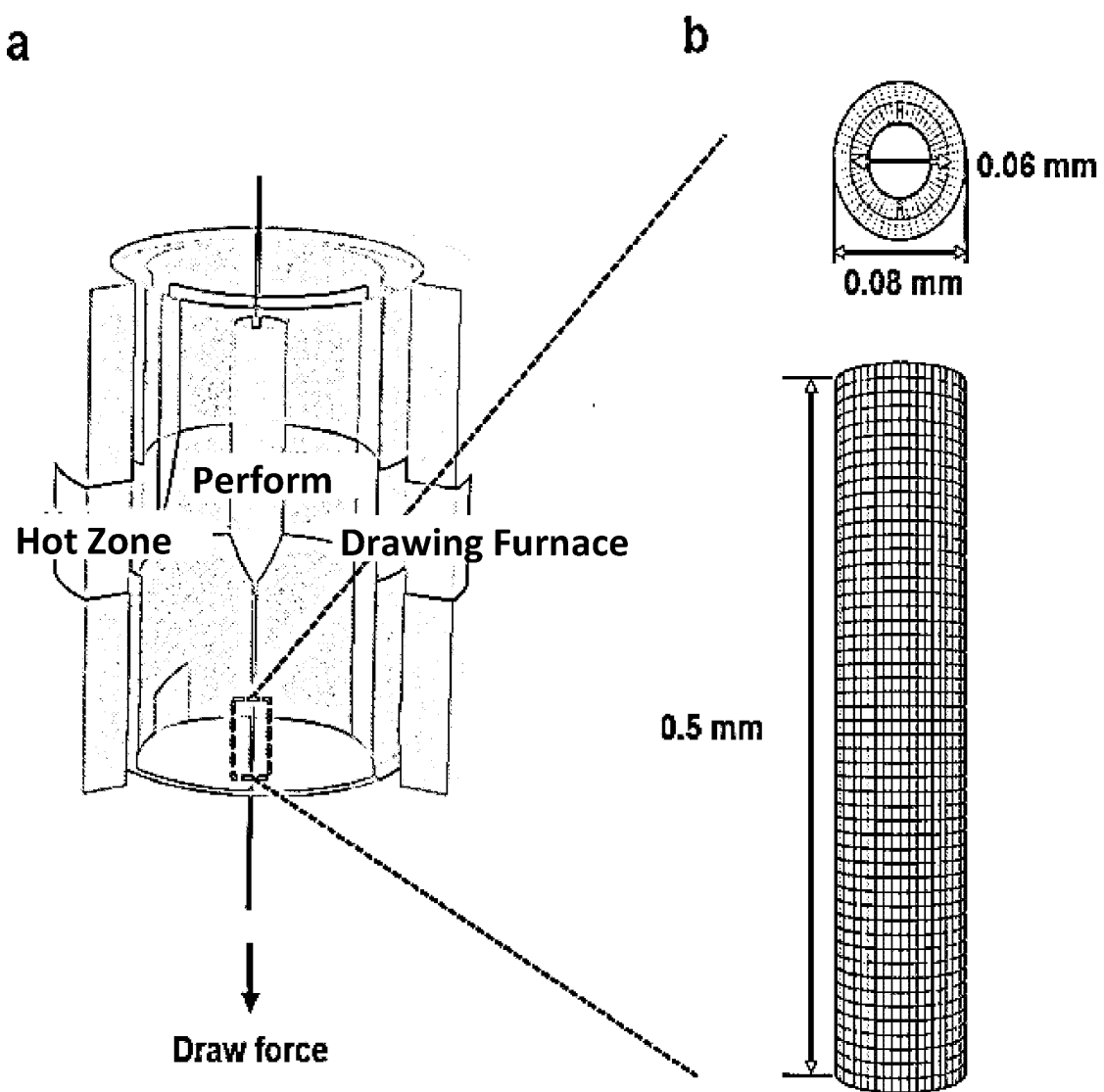


FIG. 42A

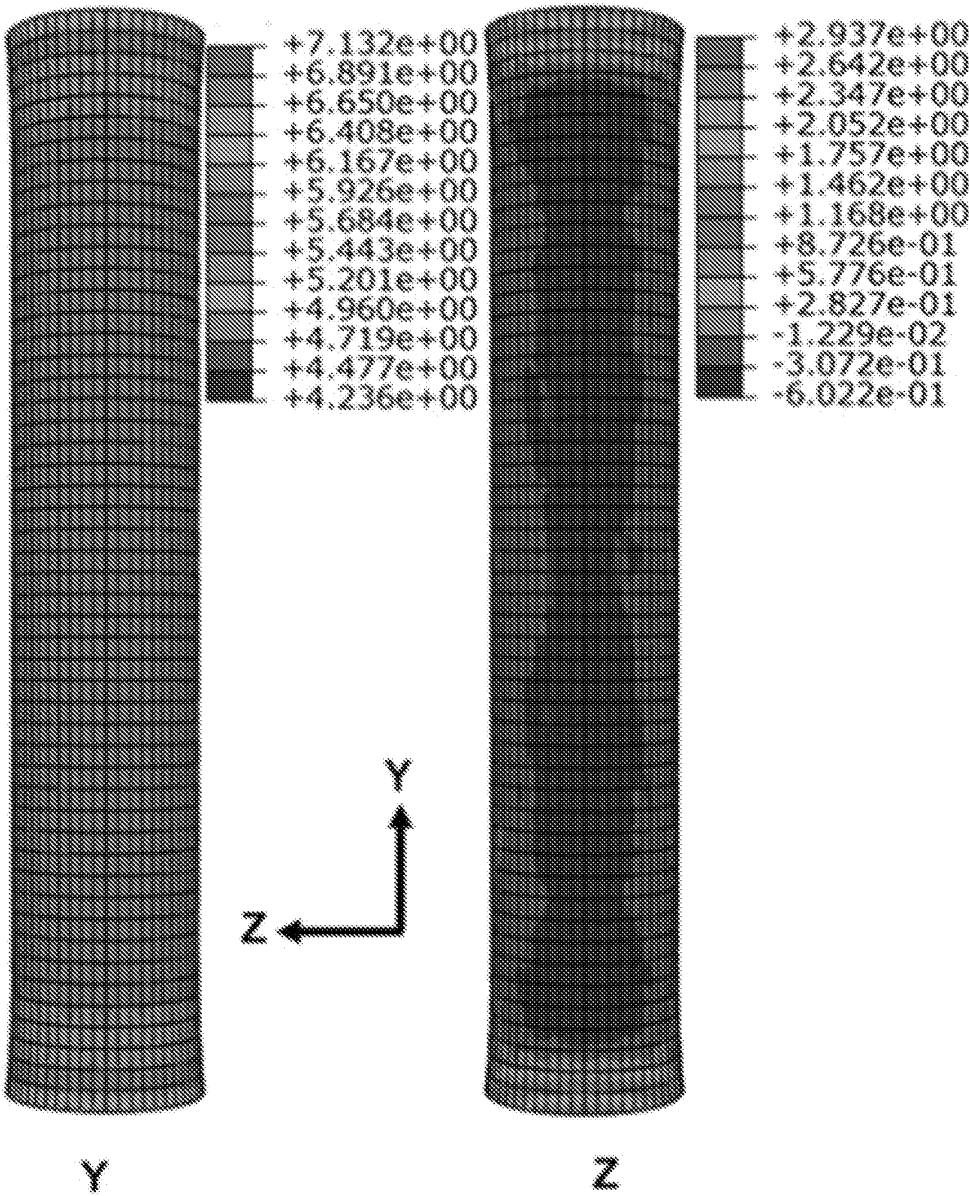


FIG. 42B

Stress (MPa)

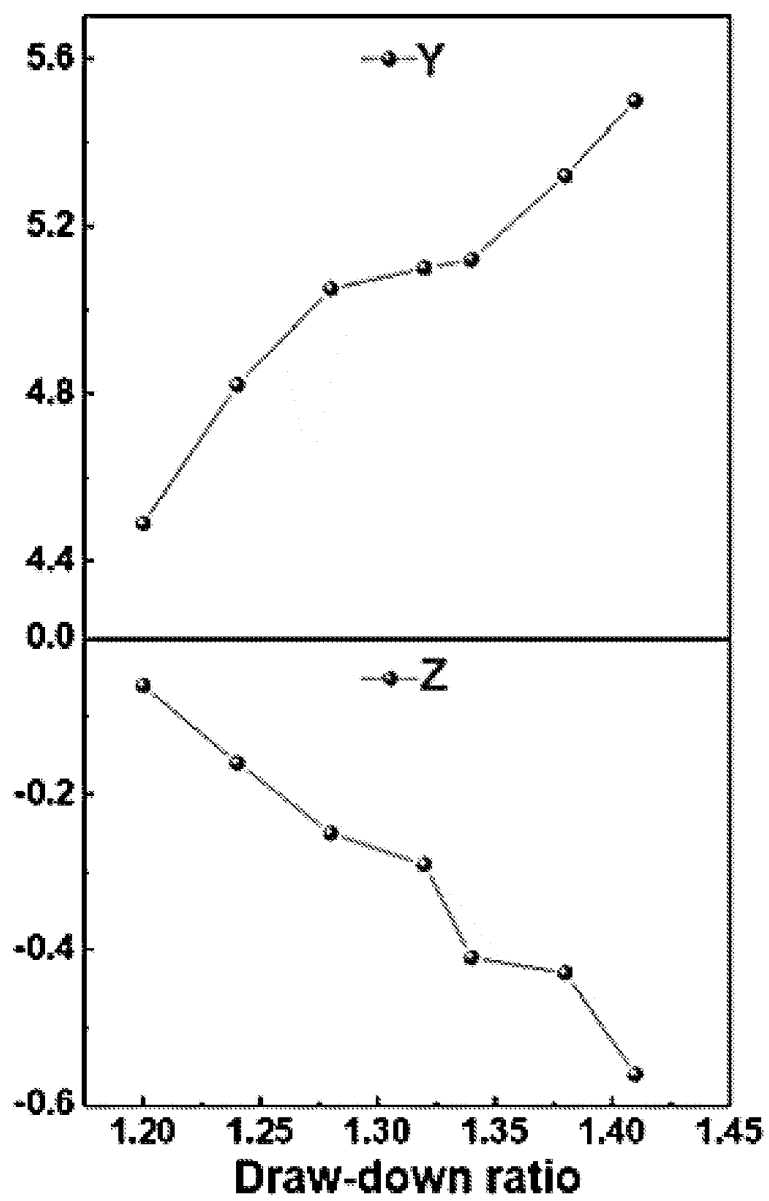


FIG. 43A

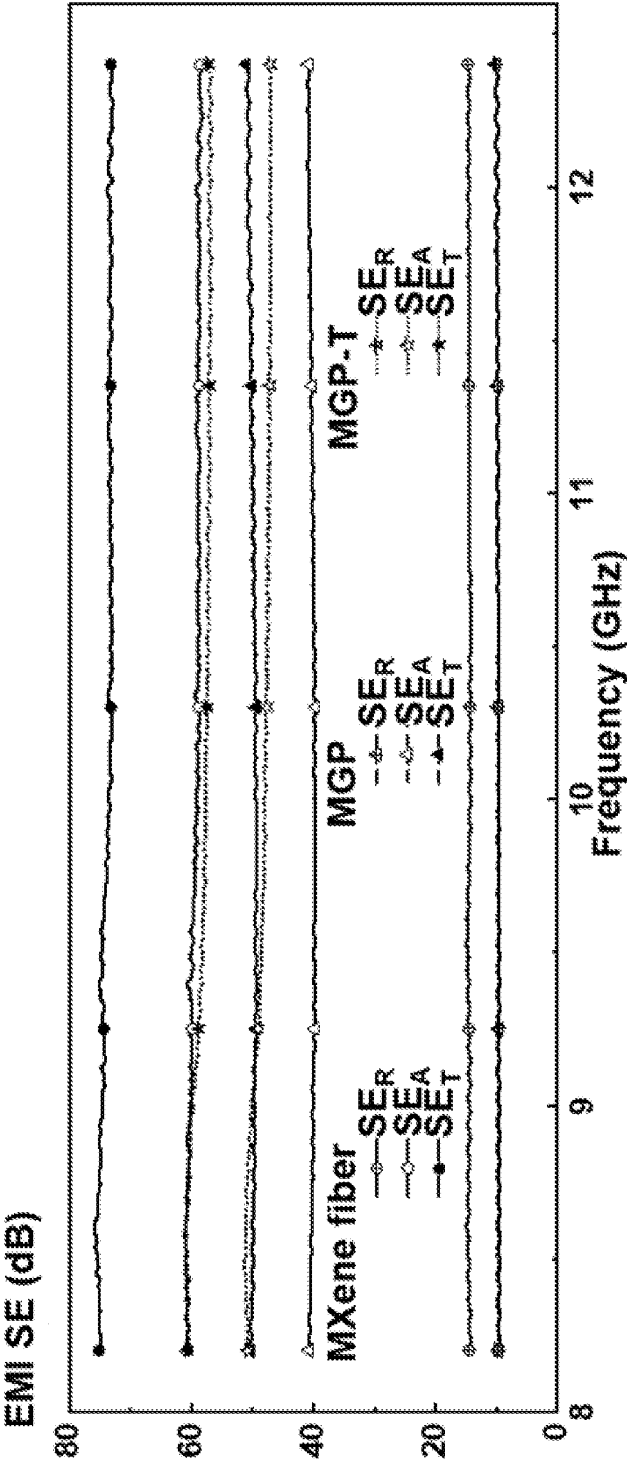


FIG. 43B

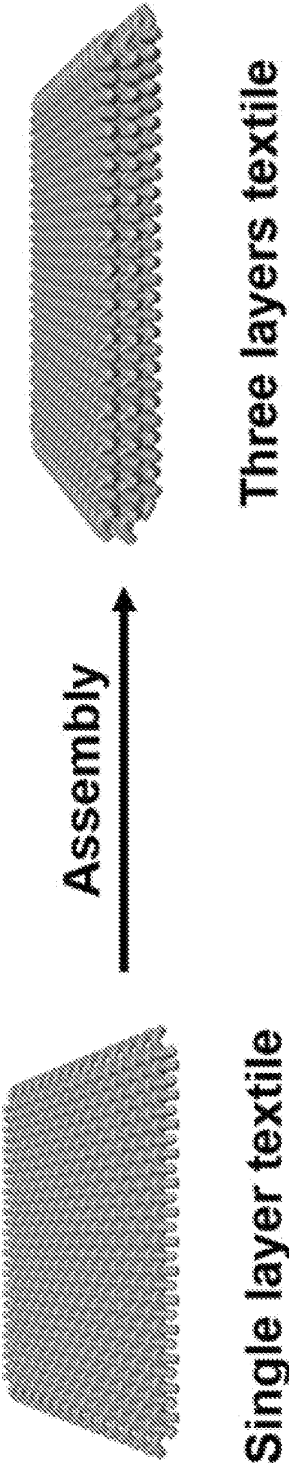


FIG. 44A

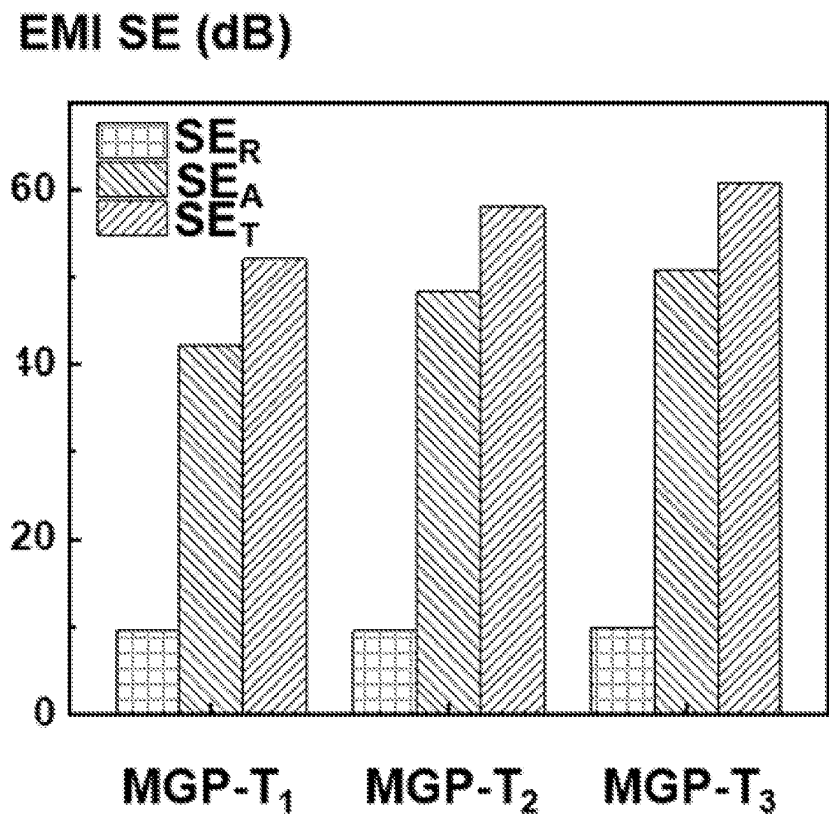


FIG. 44B

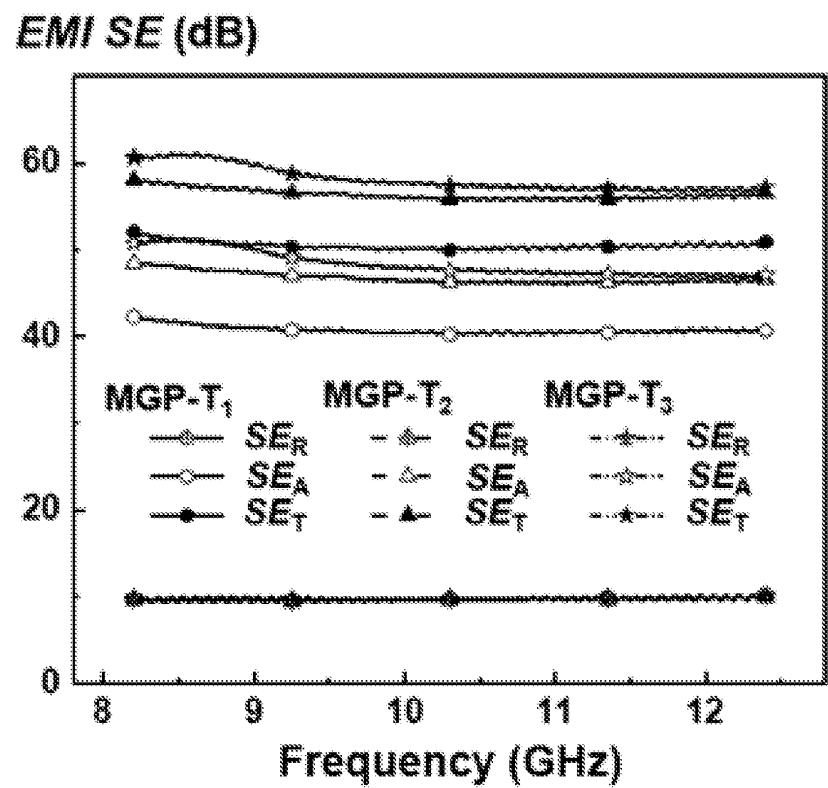


FIG. 44C

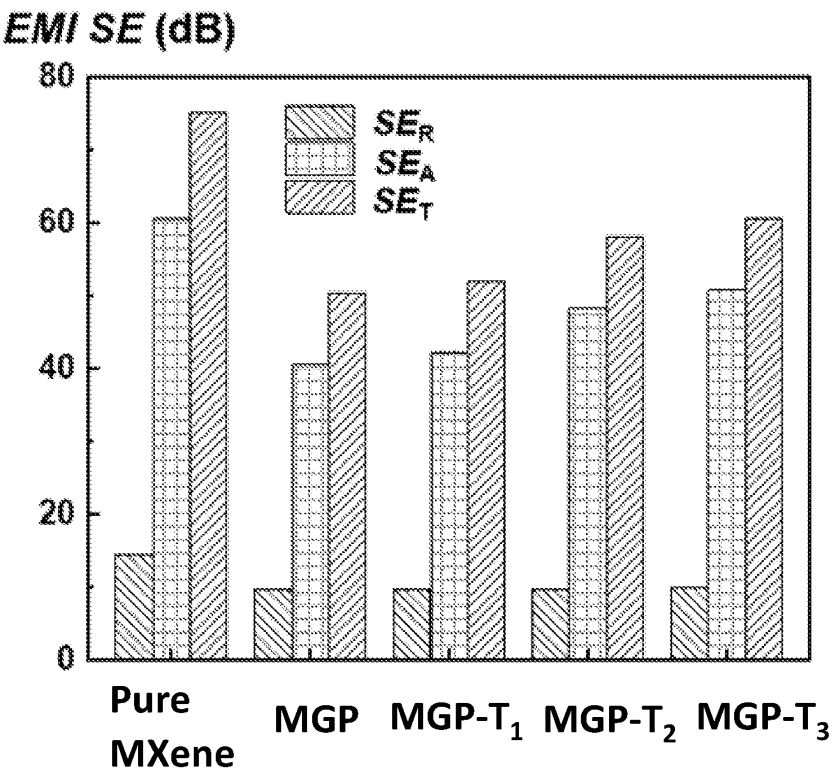


FIG. 45A

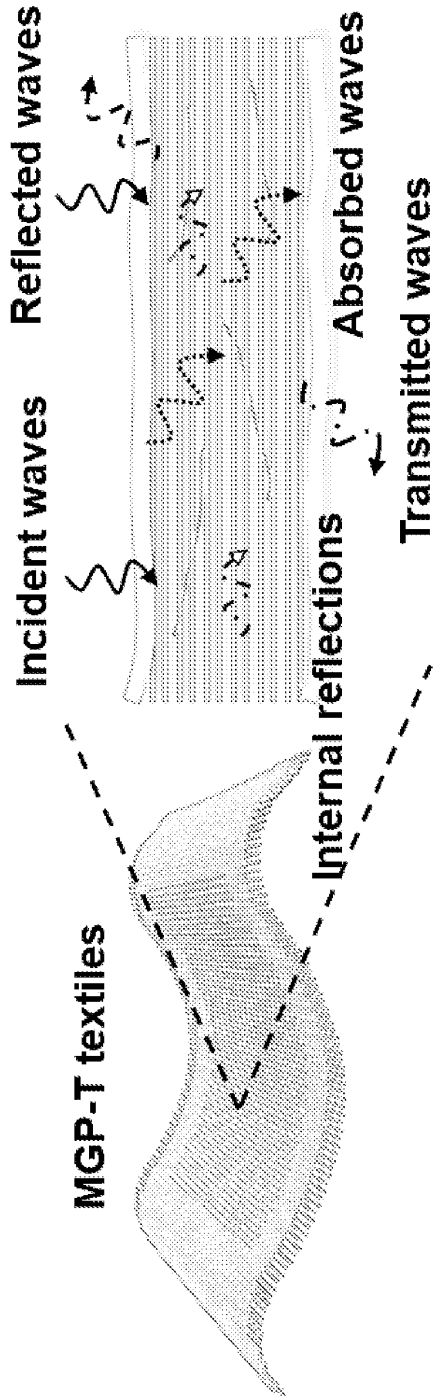


FIG. 45B

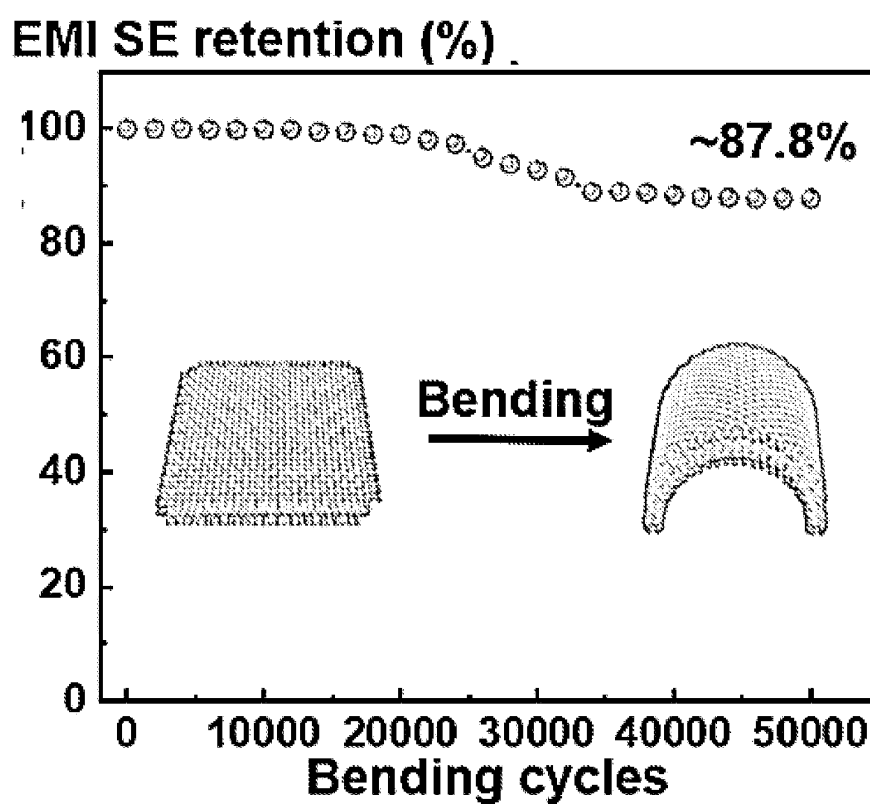


FIG. 46A

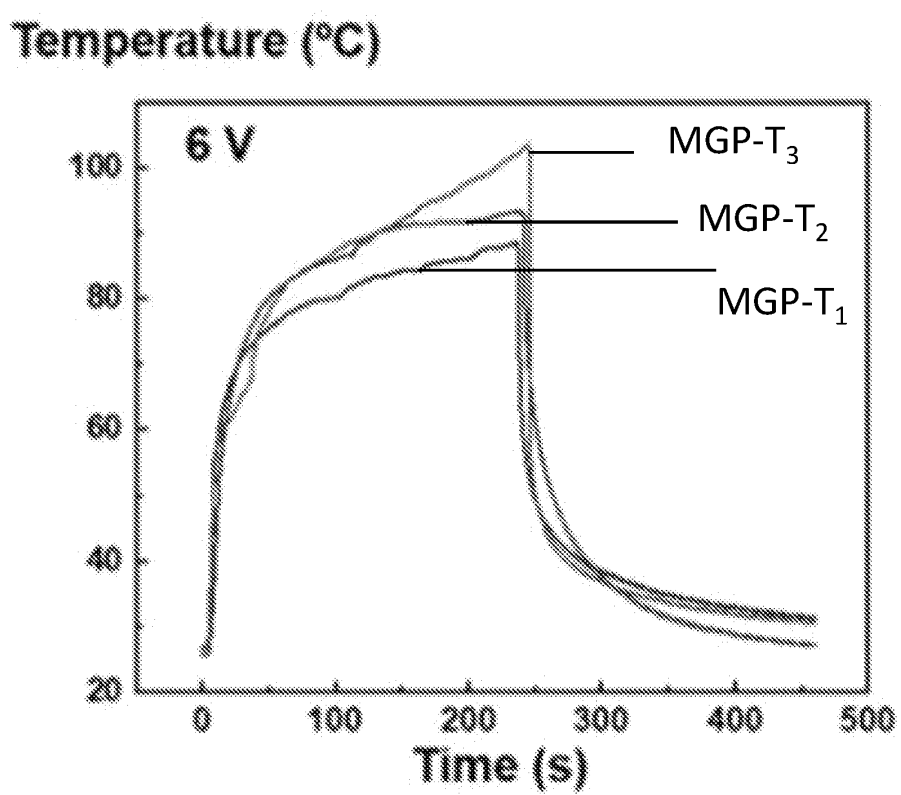


FIG. 46B

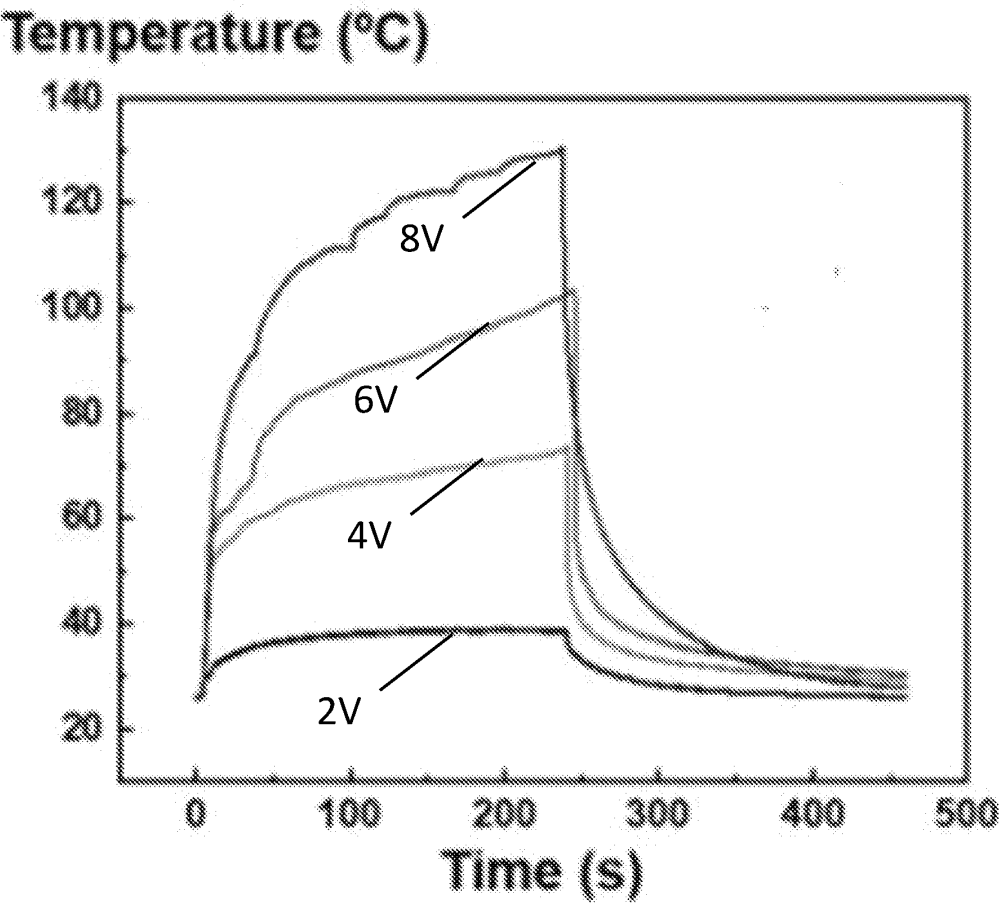


FIG. 46C

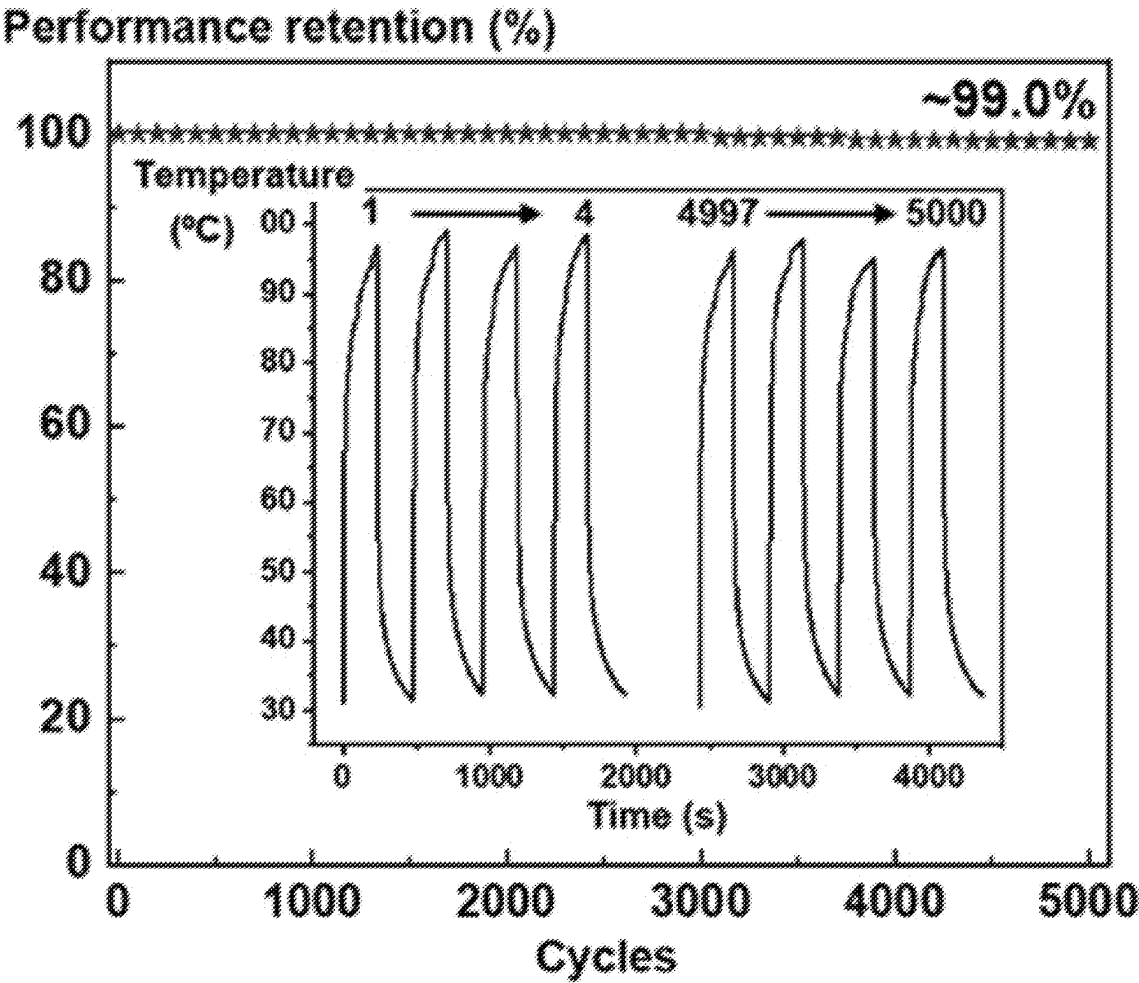


FIG. 46D

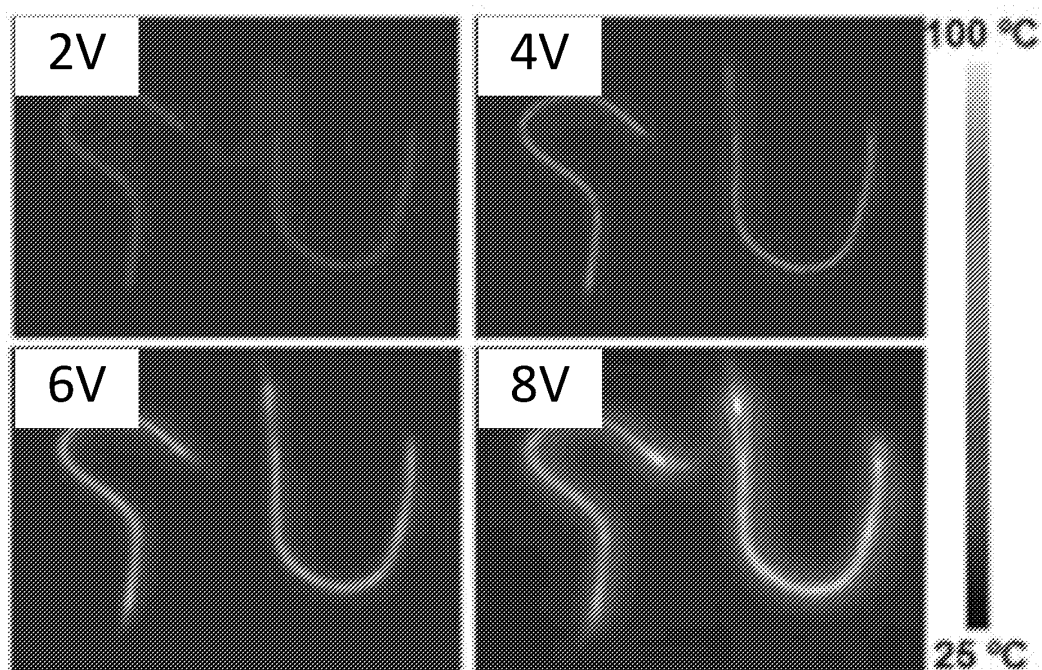


FIG. 46E

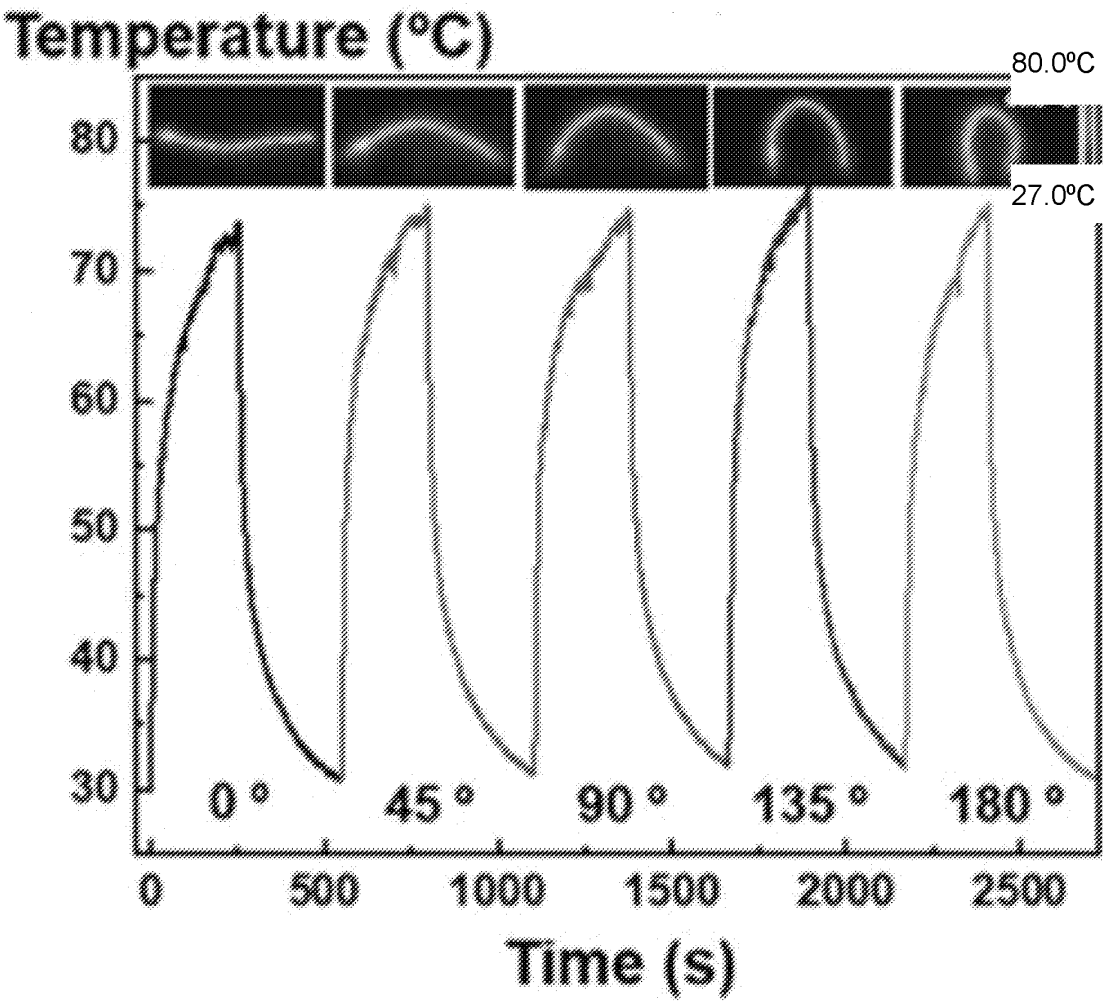
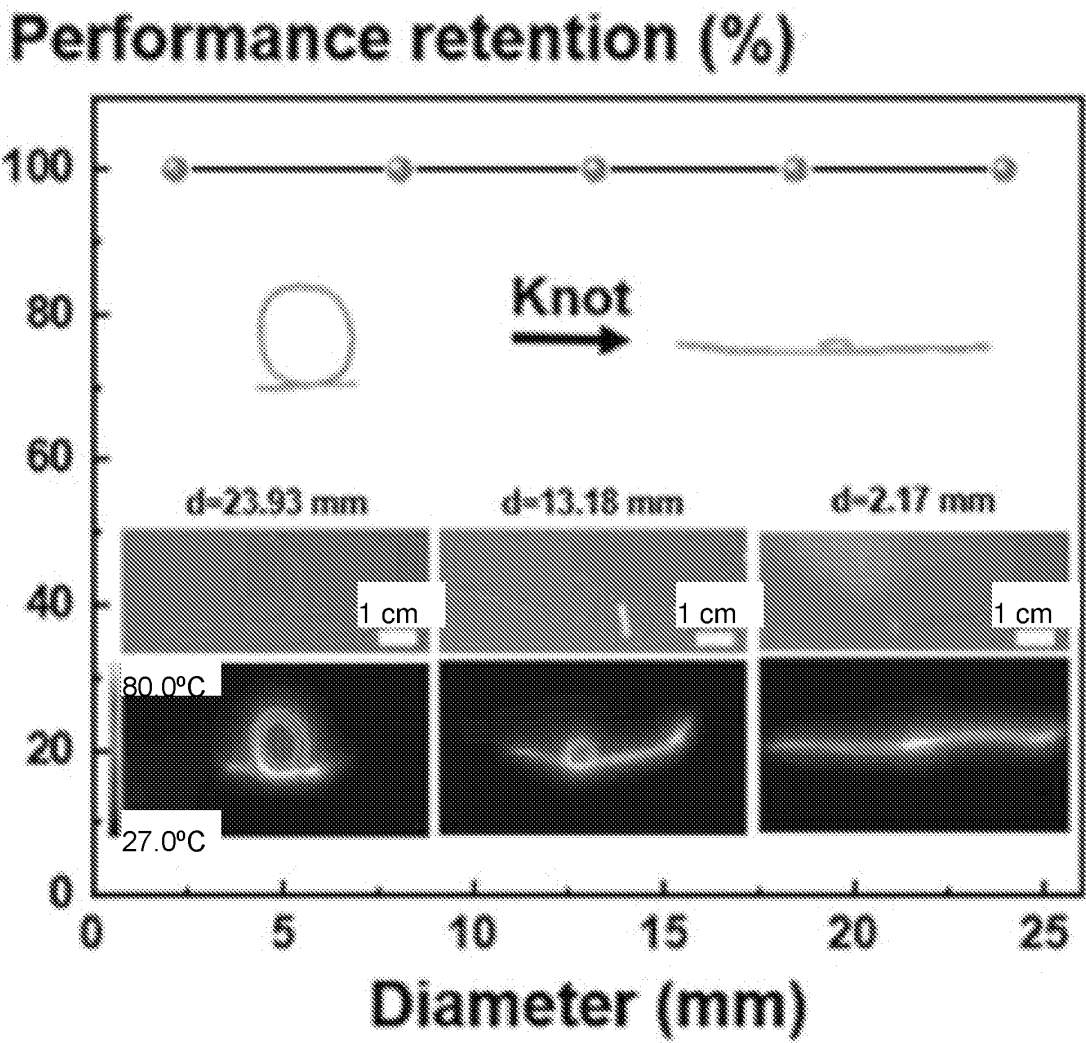


FIG. 46F



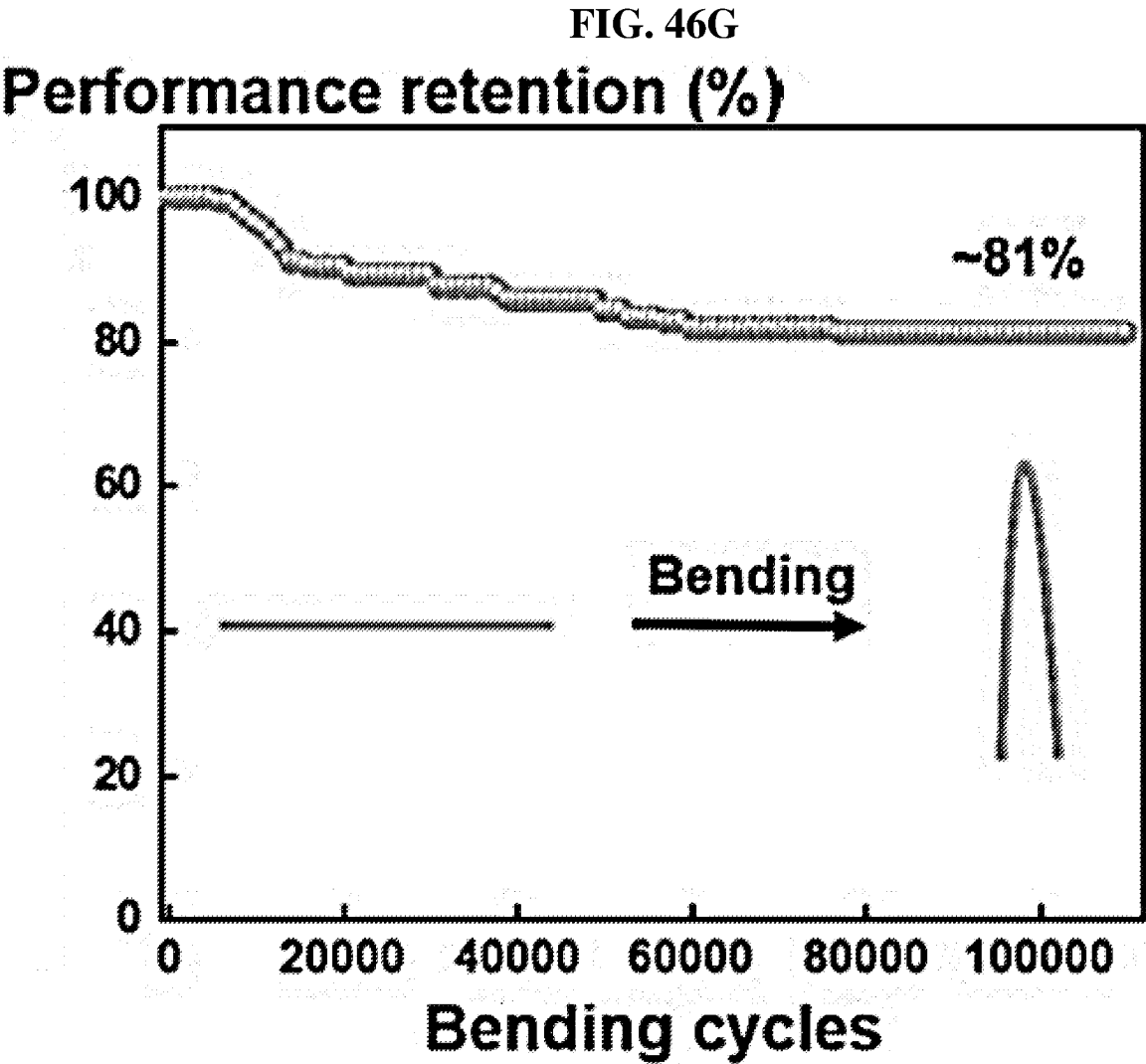


FIG. 47A

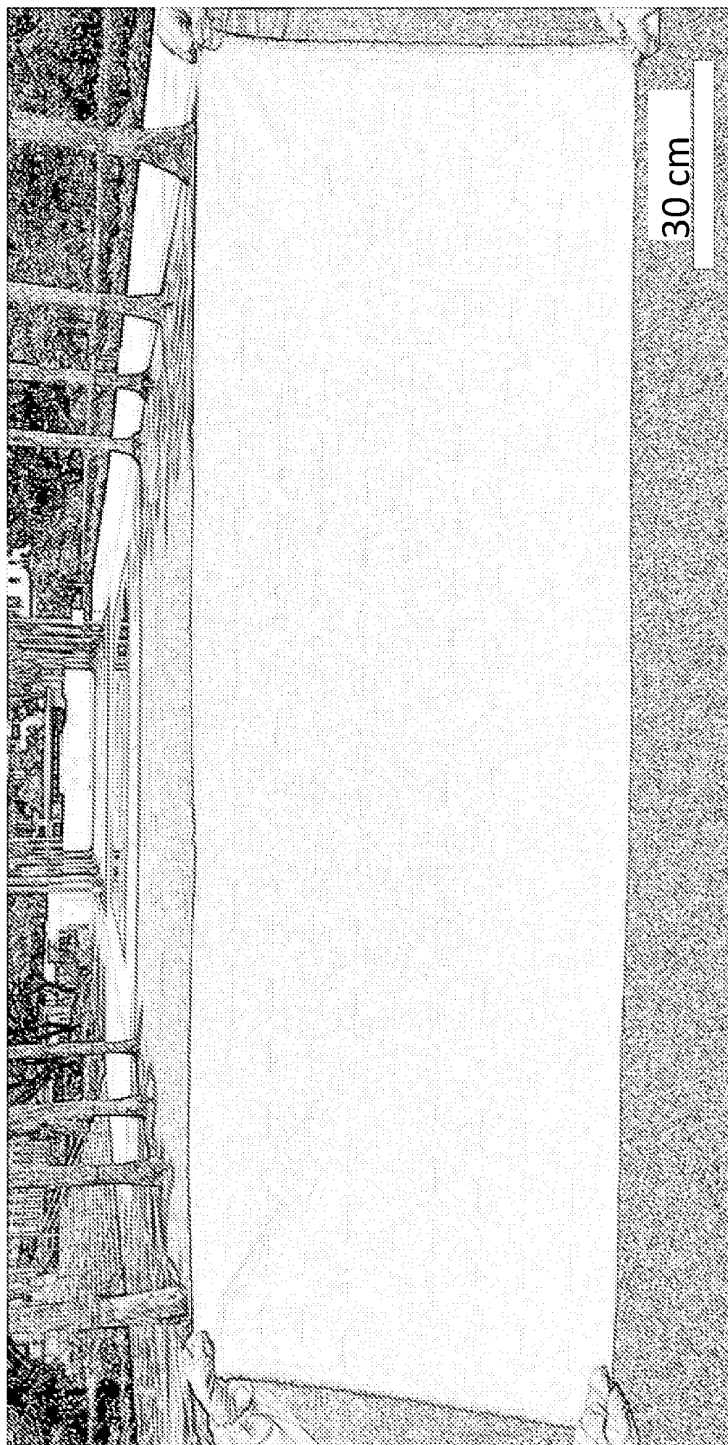


FIG. 47B

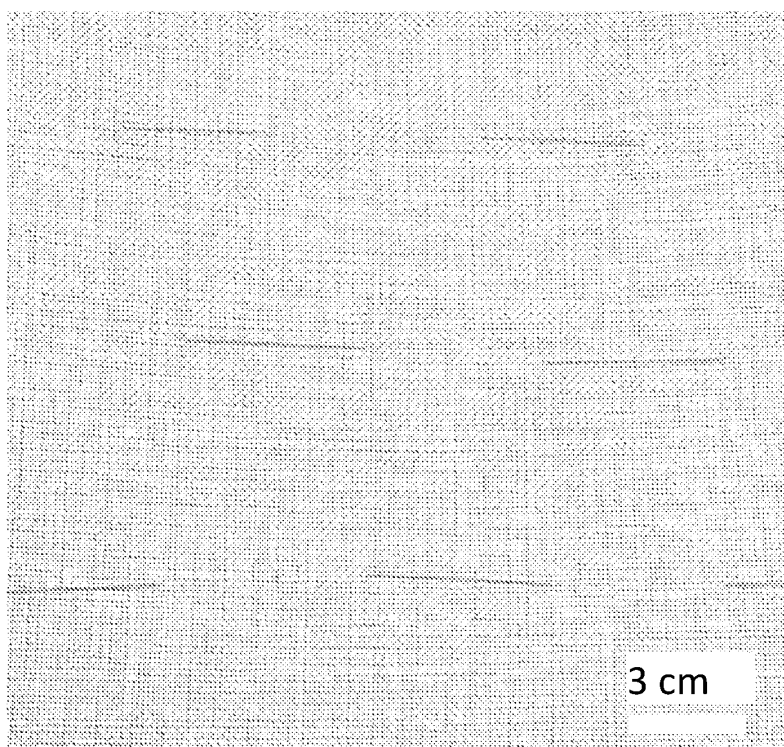


FIG. 47C

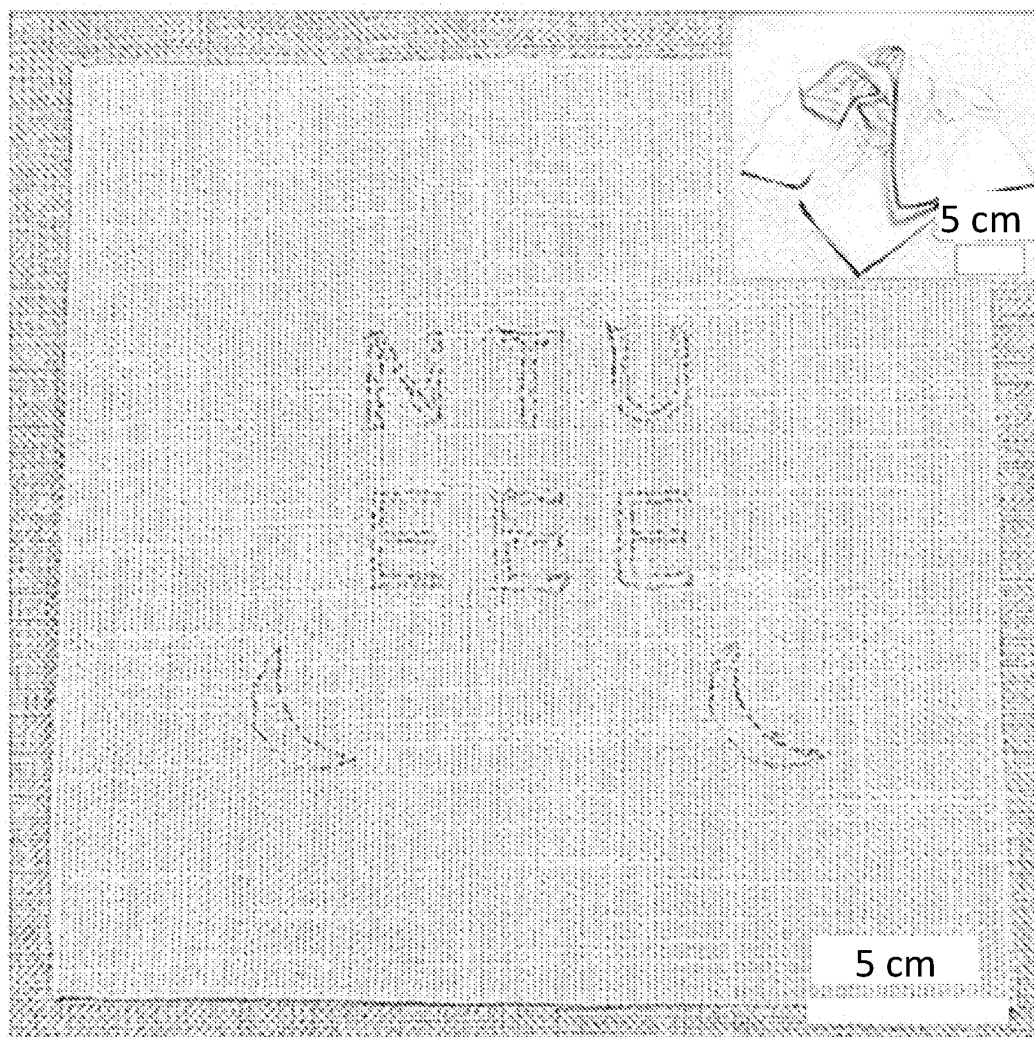


FIG. 47D

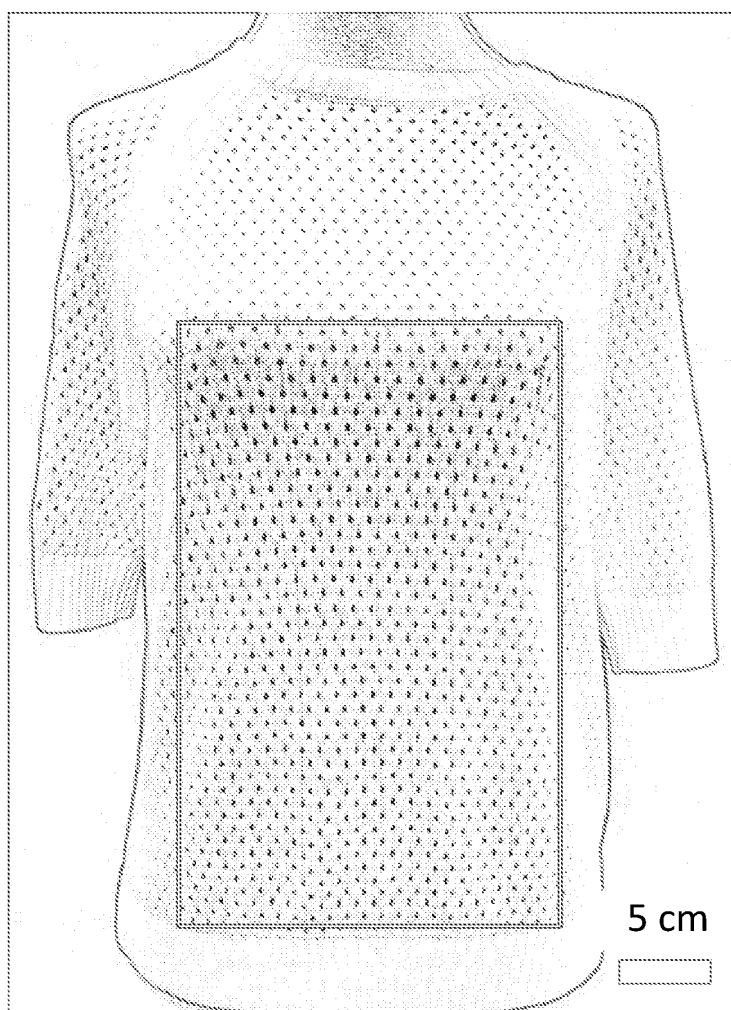


FIG. 47E

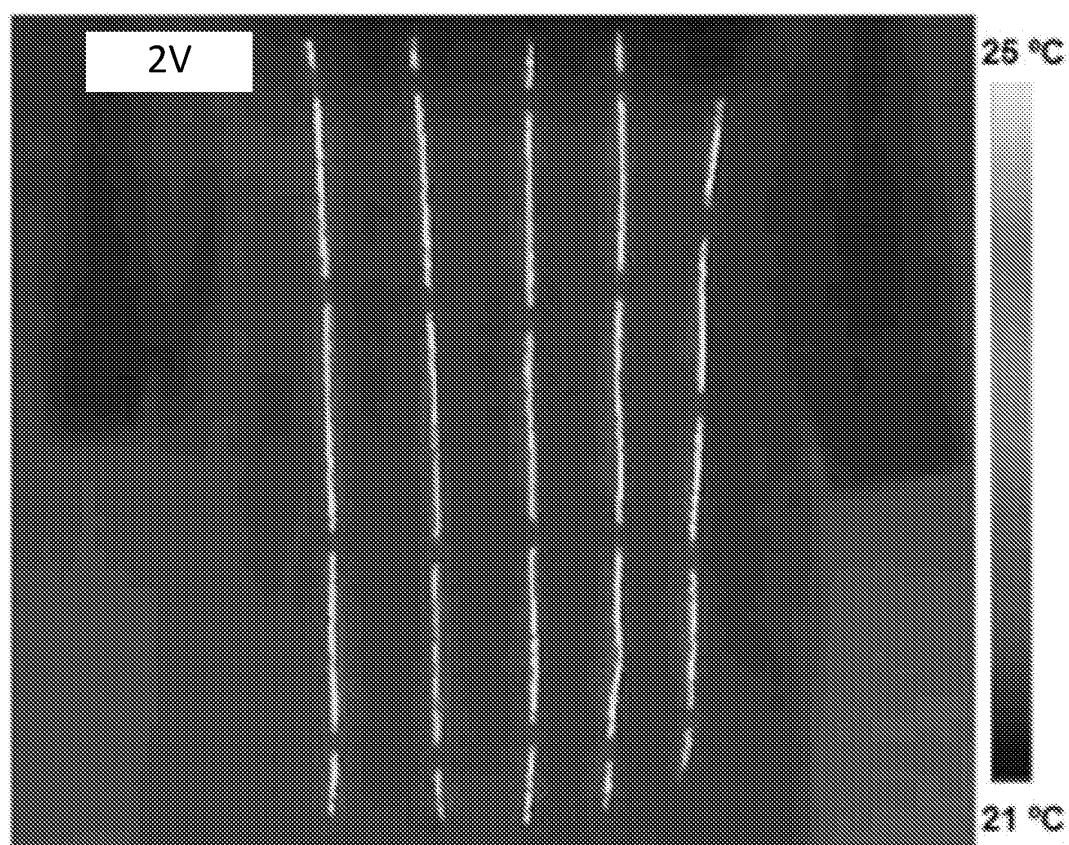


FIG. 47F

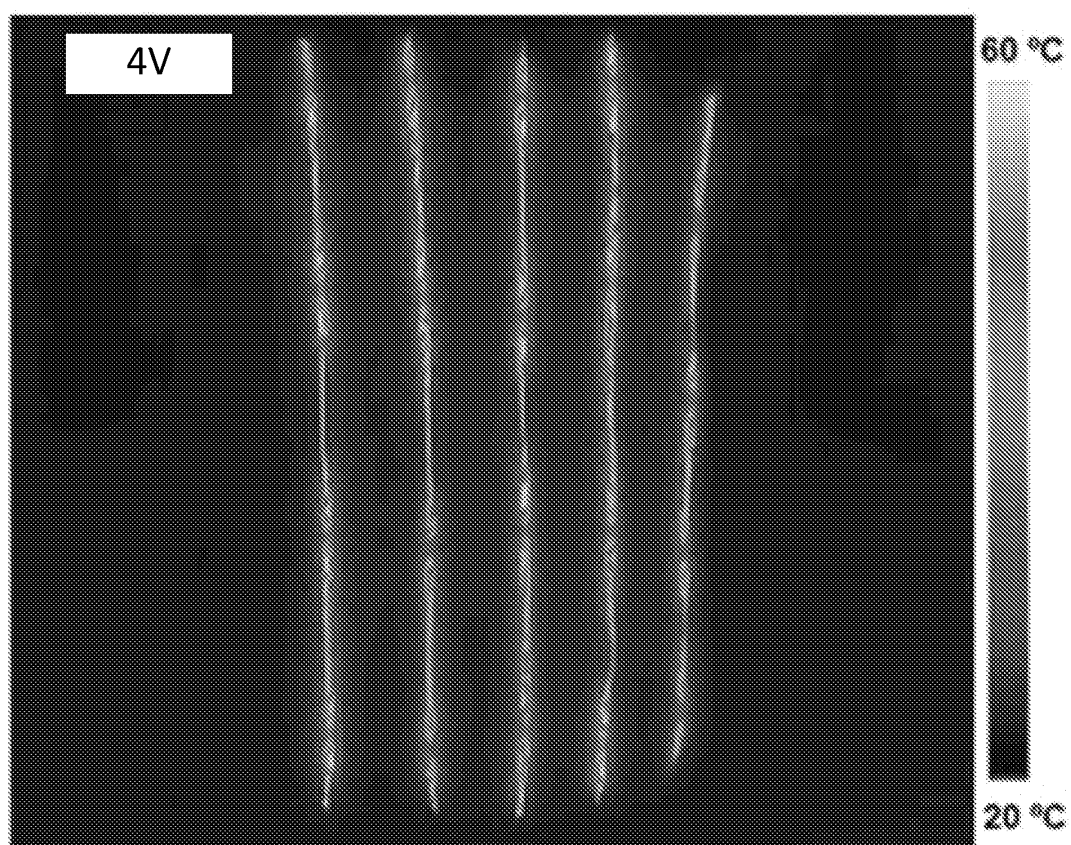


FIG. 47G

