

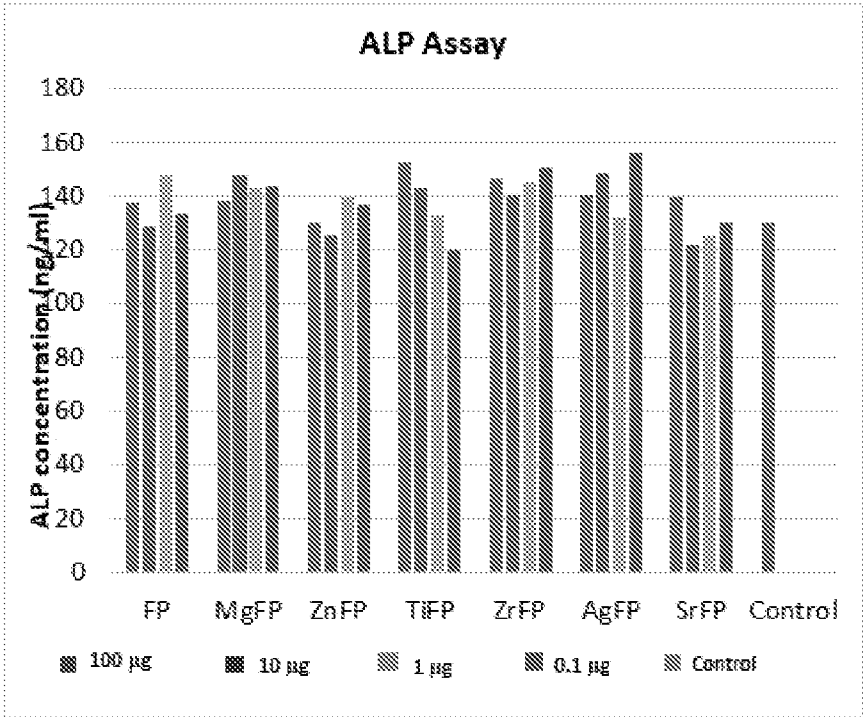


Figure 1

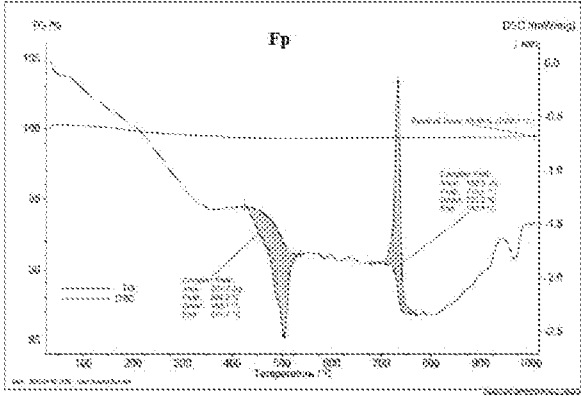


Figure 2a

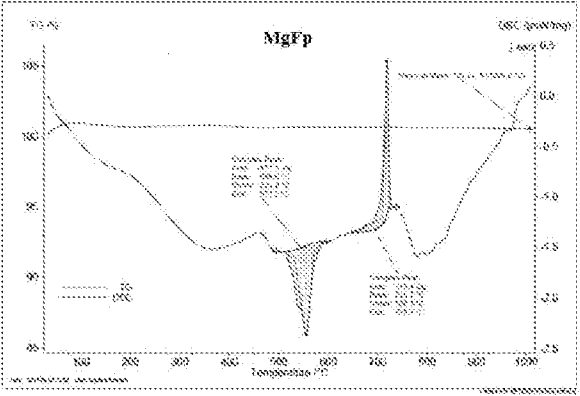


Figure 2b

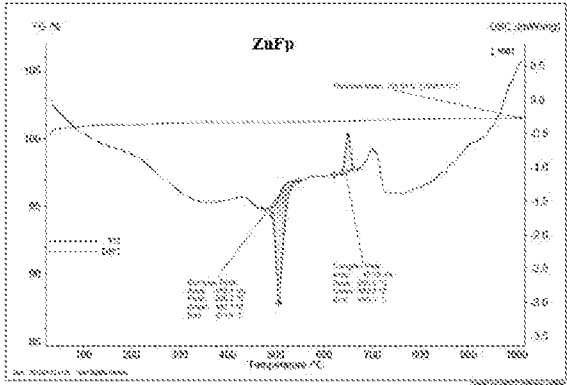


Figure 2c

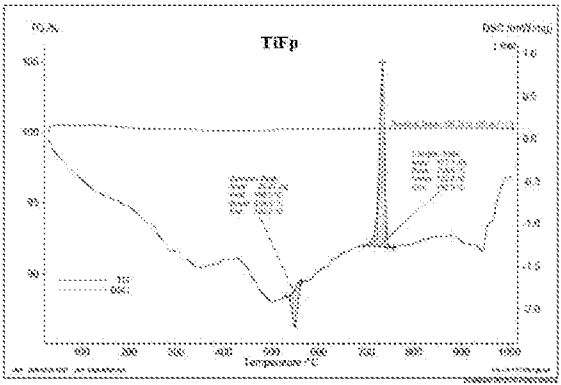


Figure 2d

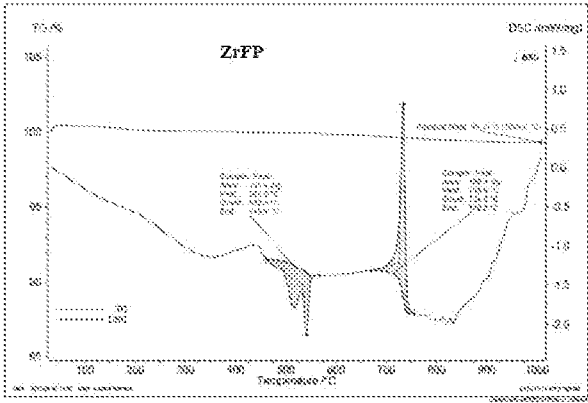


Figure 2e

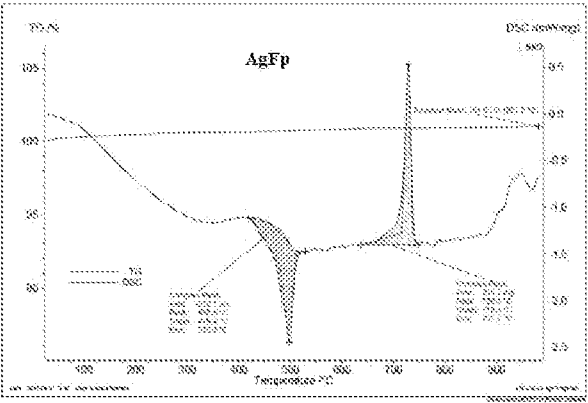


Figure 2f

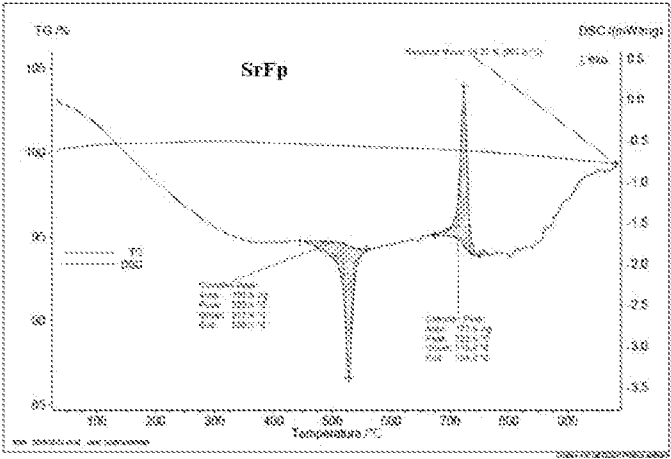


Figure 2g

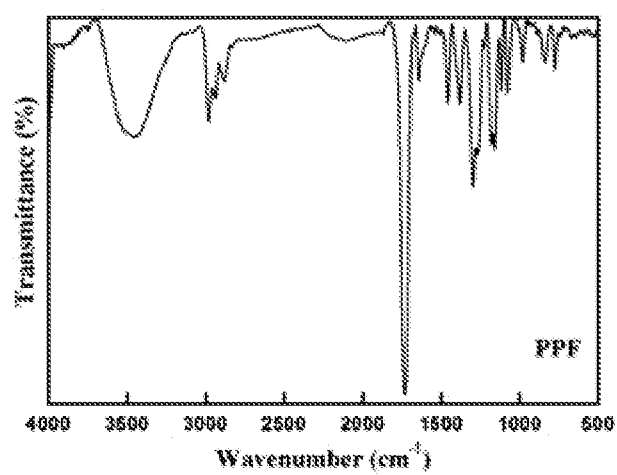


Figure 3

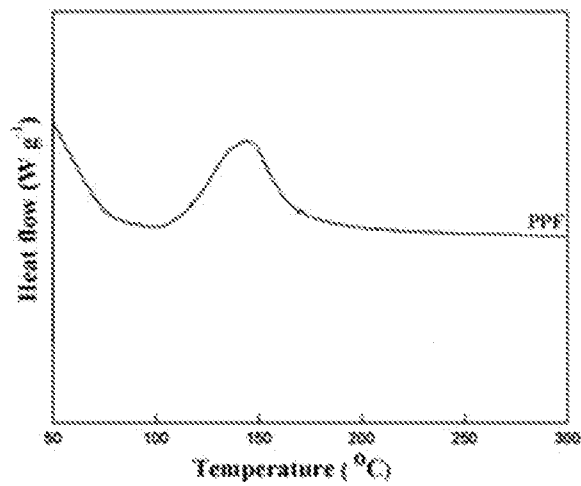


Figure 4

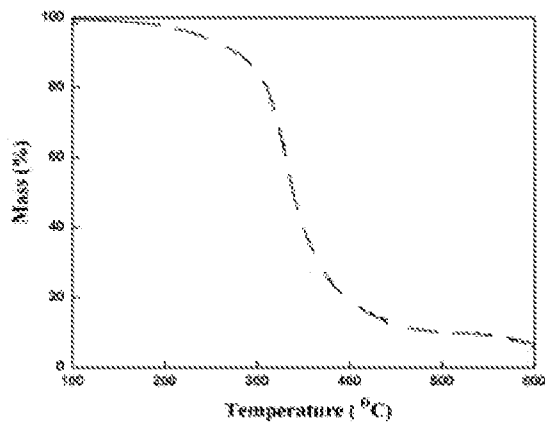


Figure 4a

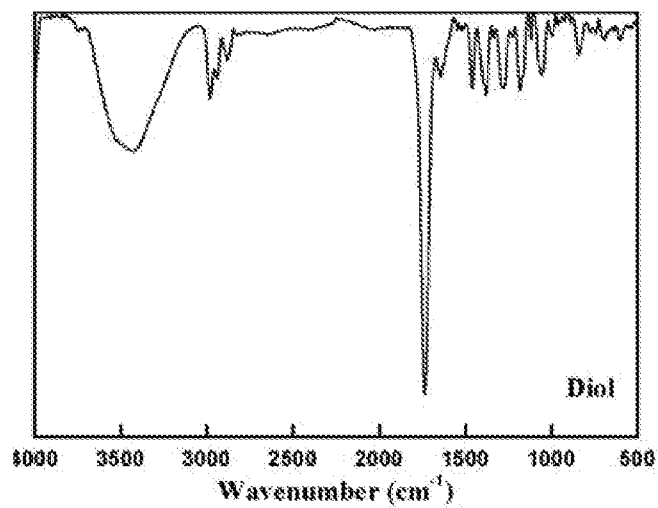


Figure 5

SAMPLE	Assignments (cm ⁻¹)					
	OH Stretch (3200-3500)	CH Stretch (2850-3000)	C=O Stretch (1735-1750)	C=C Stretch (1630-1680)	C-H Bend Asymmetric methyl bend (1450-1470)	C-H Bend (1355-1395)
PPF	3160	2981	1747	1643	1457	1373
1,2 Diol	3461	2980	1736	1640	1460	1378

Figure 5a

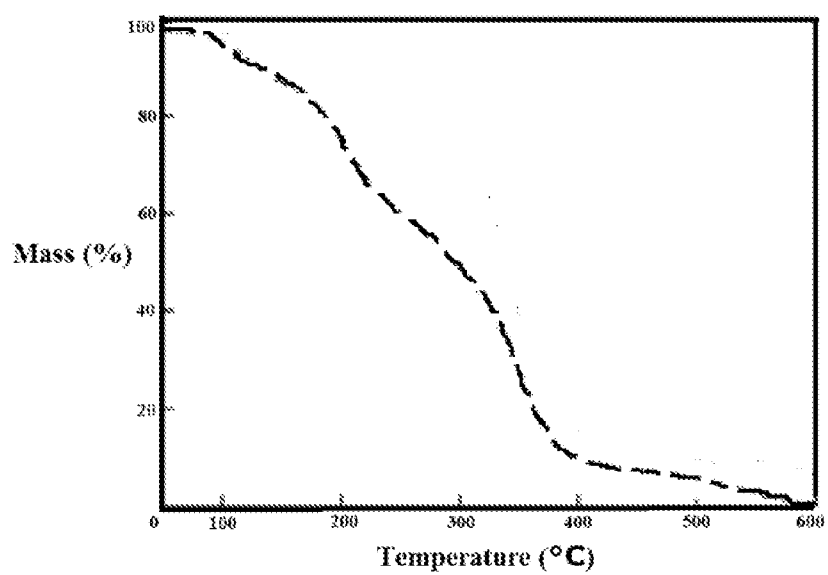


Figure 6

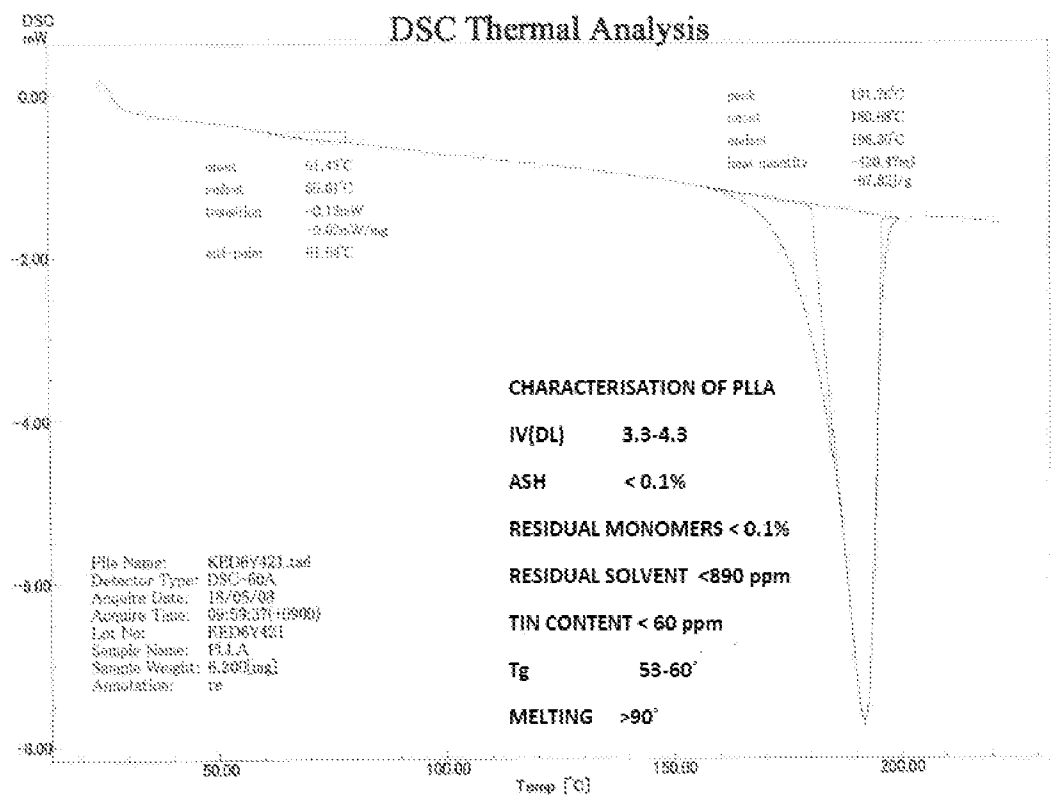


Figure 7

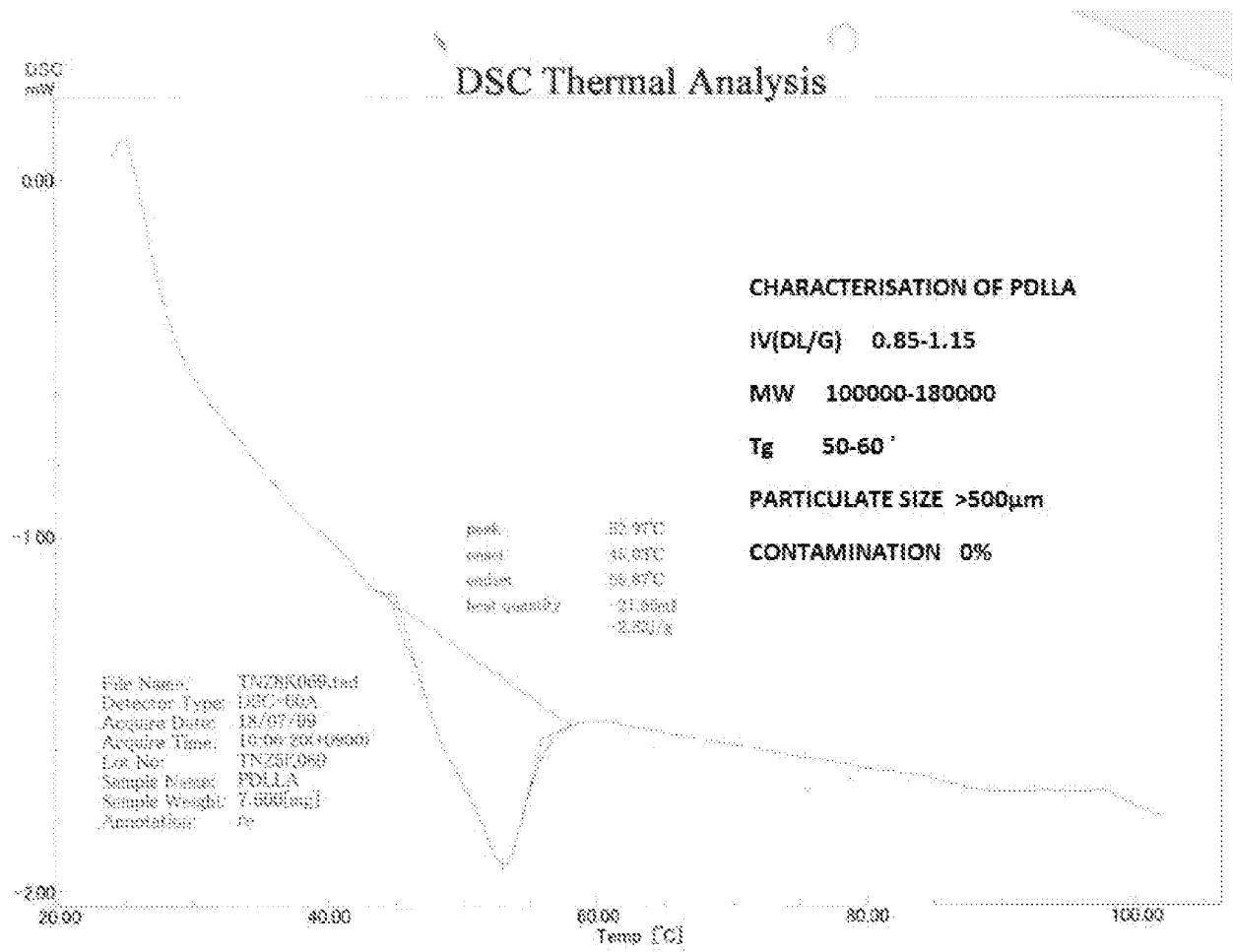


Figure 8

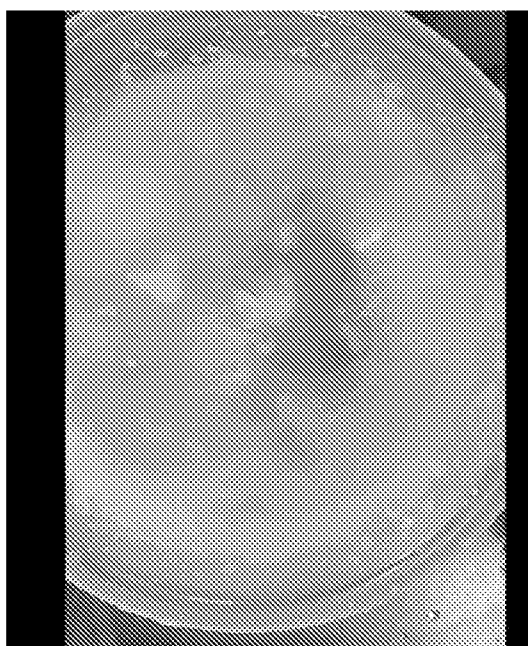


Figure 9



Figure 10

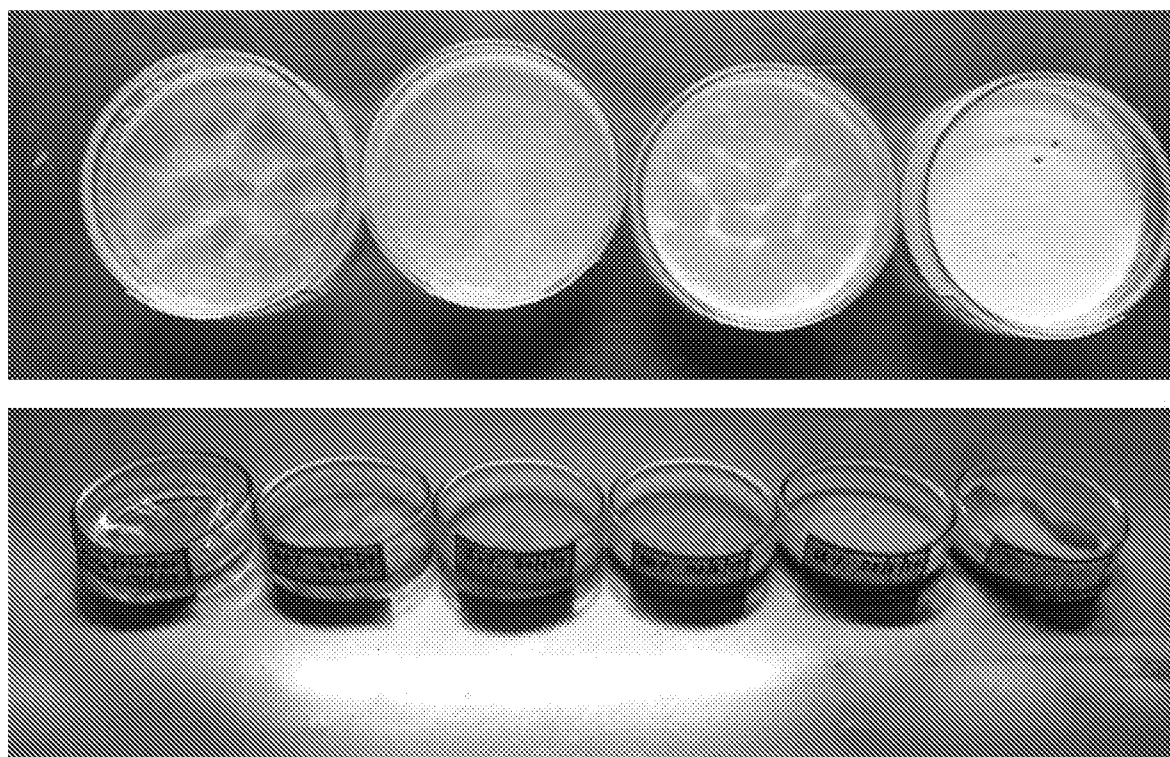


Figure 11

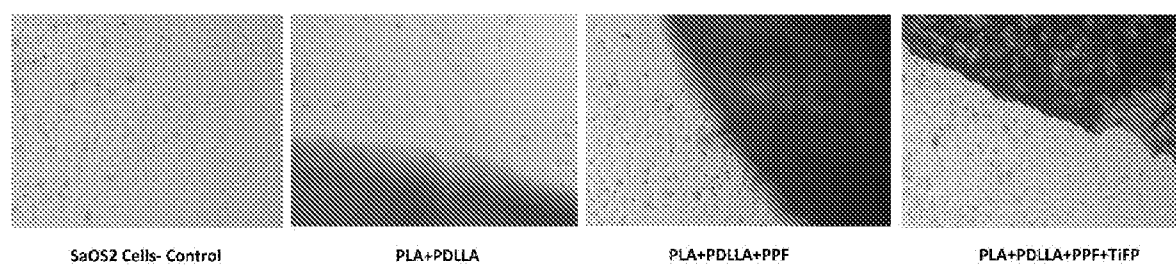


Figure 12

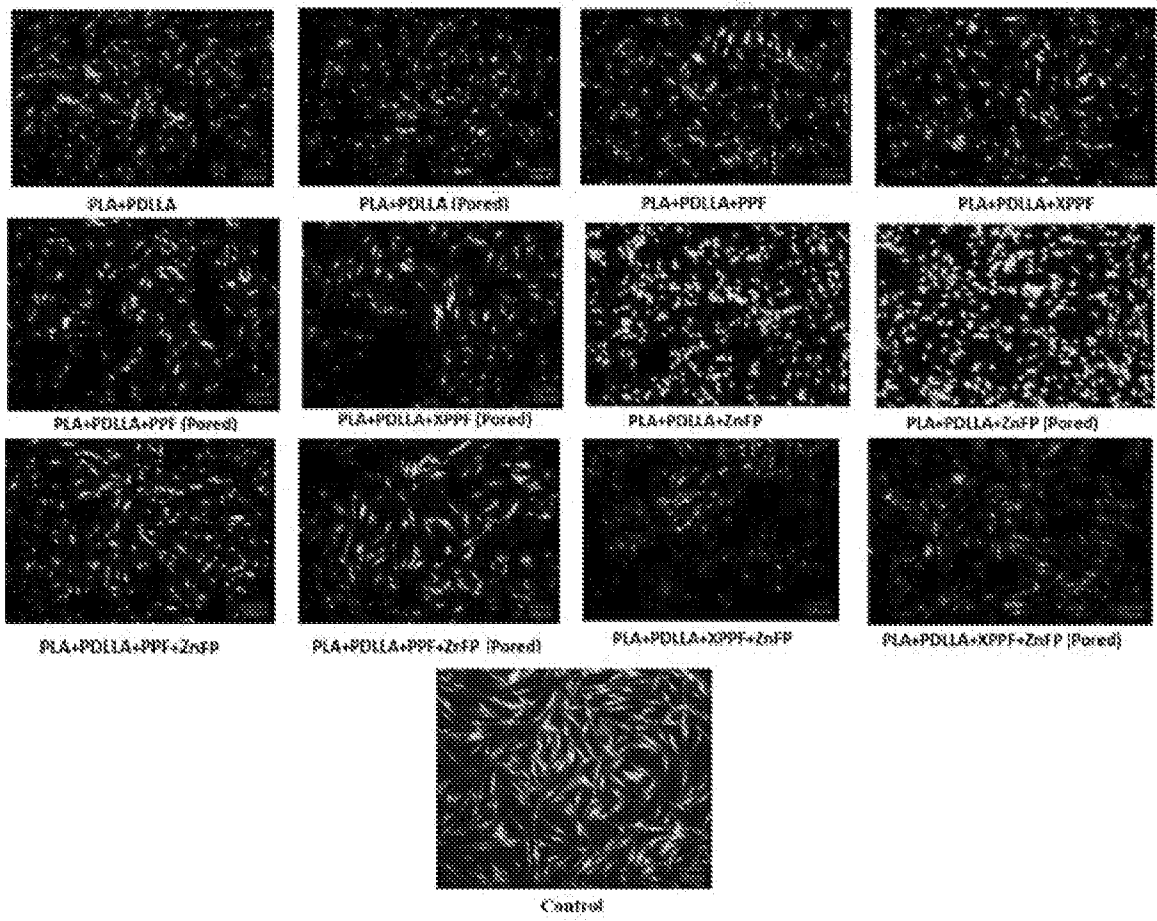
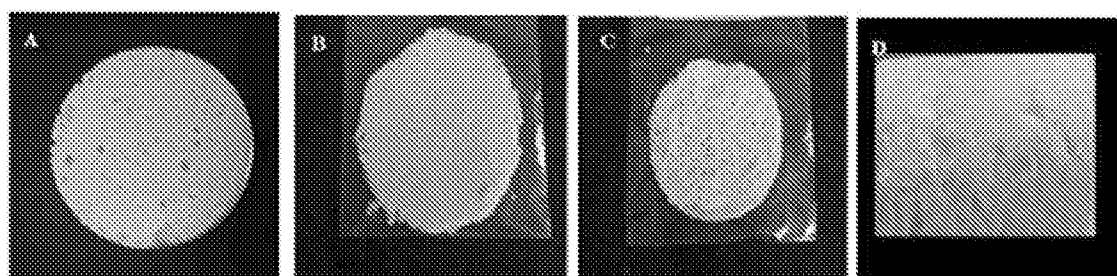


Figure 13



**A-Salt leaching; B-Gel Pressing; C-Gas Foaming;
D-Precipitation-Freeze drying**

Figure 14

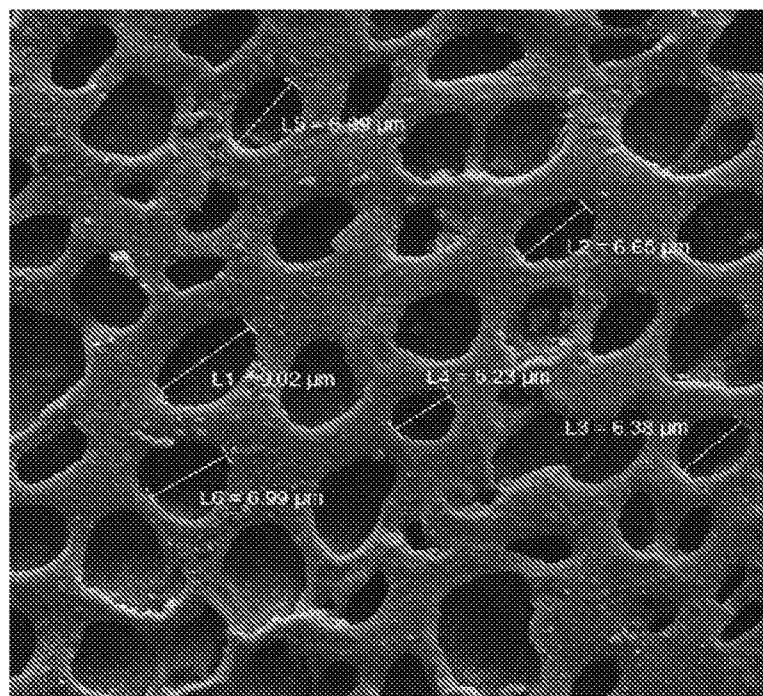


Figure 14a

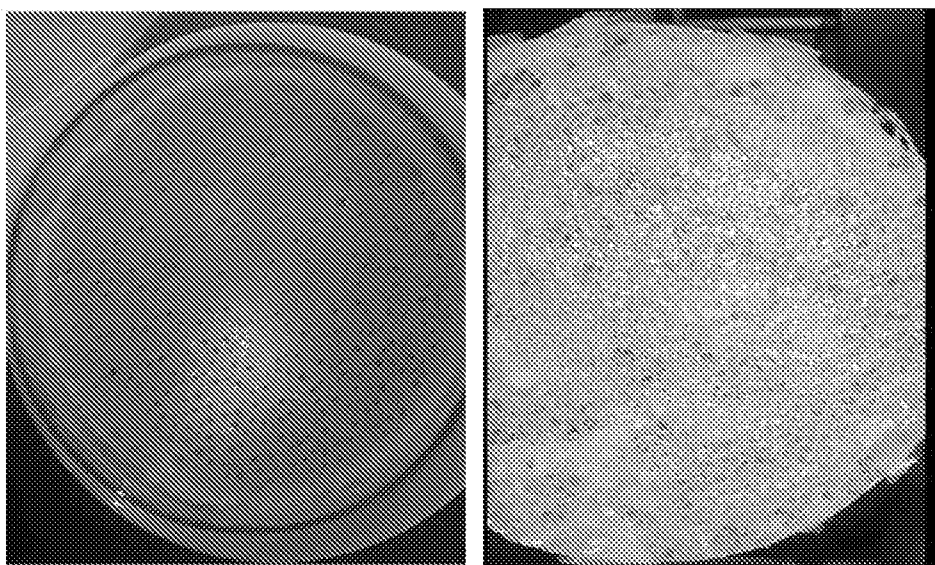
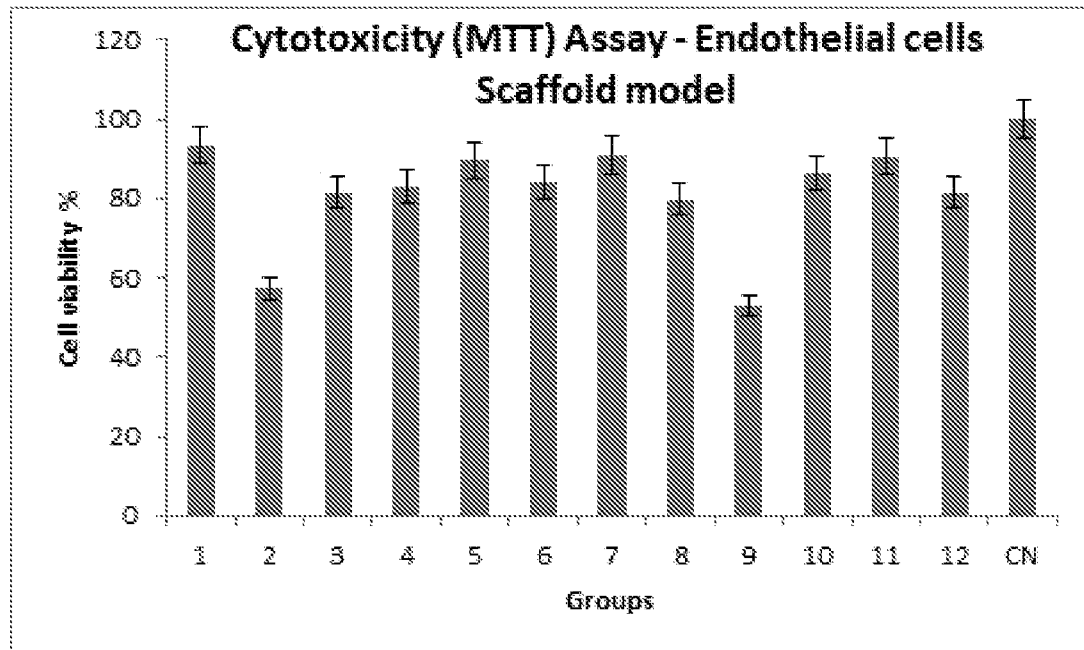


Figure 14b



1-PLA+PDLLA+PPF+AgFP; 2-PLA+PPF+AgFP; 3-PLA+PDLLA+Diol+AgFP;
4-PLA+Diol+AgFP; 5-PLA+PDLLA+PPF+ZnFP; 6-PLA+PPF+ZnFP;
7-PLA+PDLLA+Diol+ZnFP; 8-PLA+Diol+ZnFP; 9-PLA+PPF+MgFP;
10-PLA+PDLLA+PPF+MgFP; 11-PLA+Diol+MgFP;
12-PLA+PDLLA+Diol+MgFP; CN-Control

Figure 15

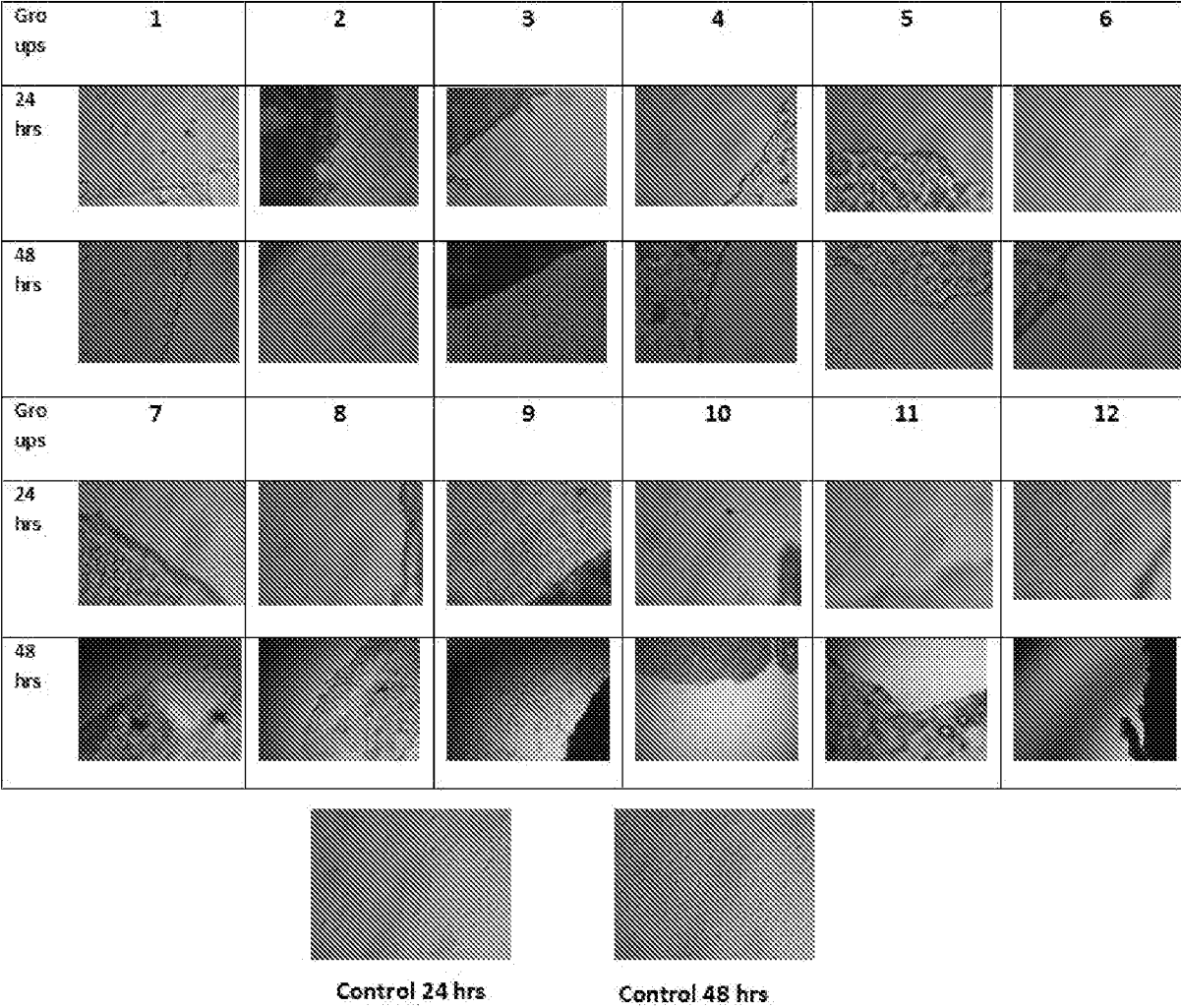


Figure 15a

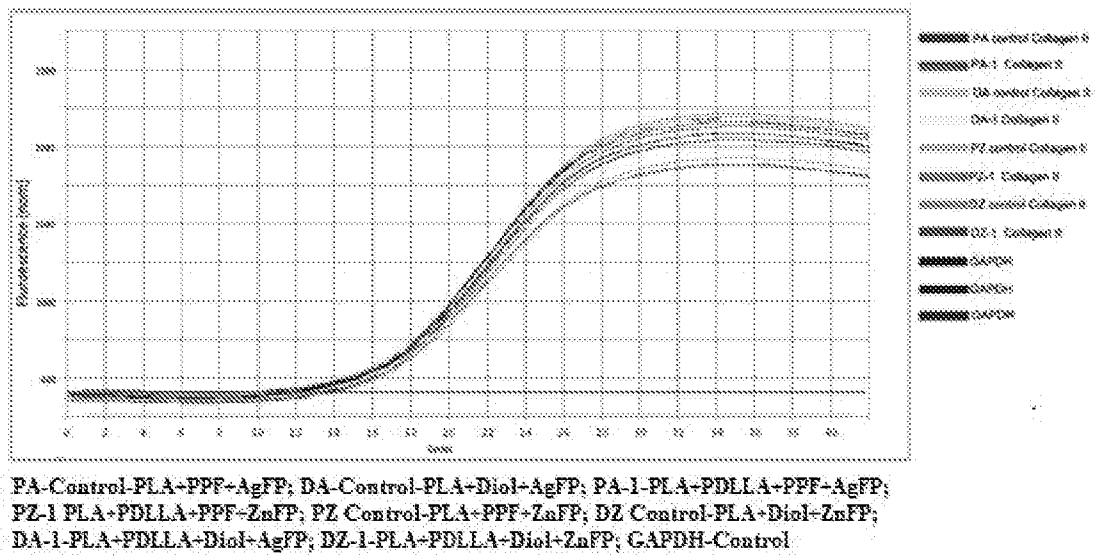


Figure 16

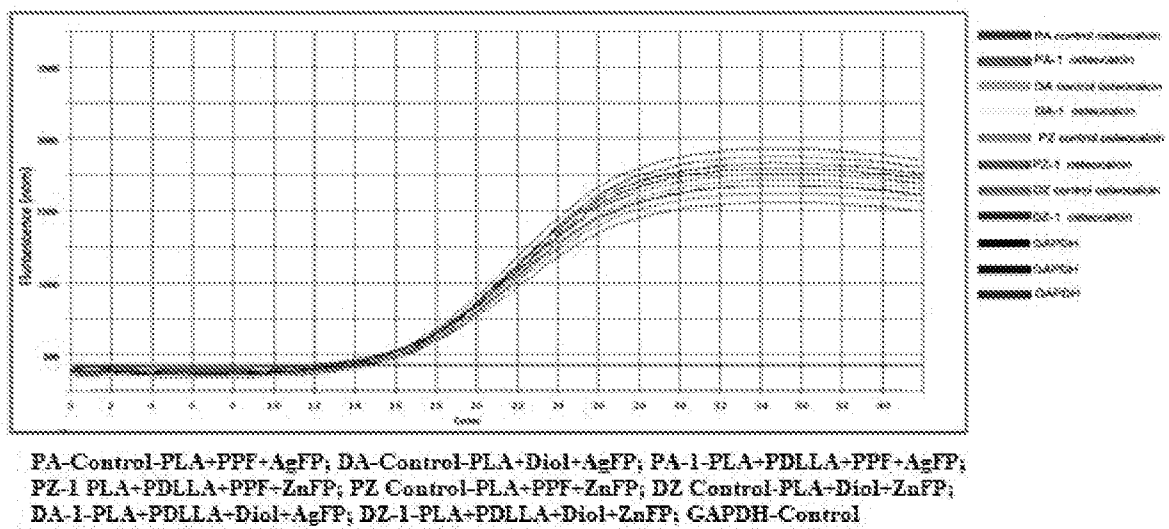
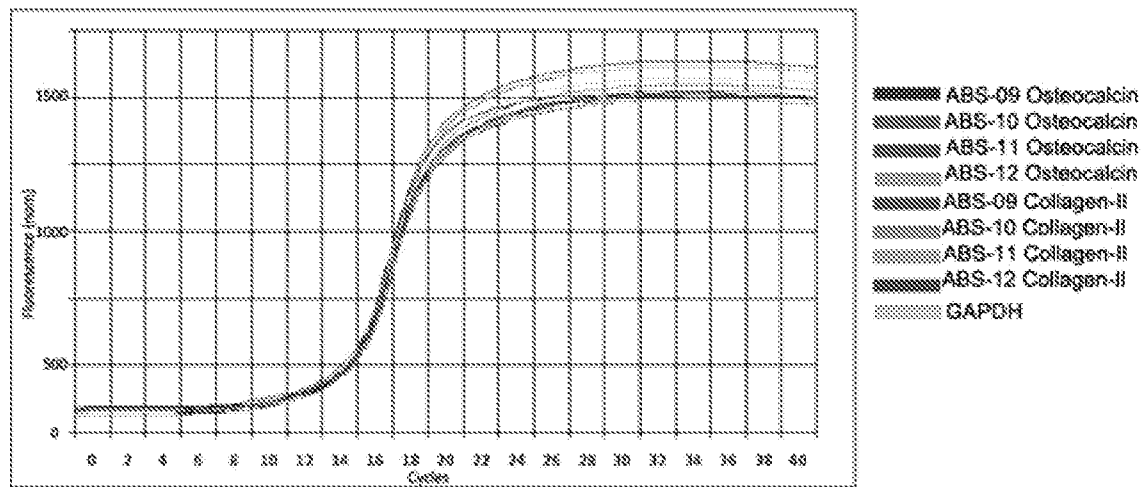


Figure 17



ABS-09-PLA+PPF+MgFP; ABS-10-PLA+PDLLA+PPF+MgFP;
ABS-11-PLA+Diol+MgFP; ABS-12-PLA+PDLLA+Diol+MgFP;
GADPH-Control

Figure 18

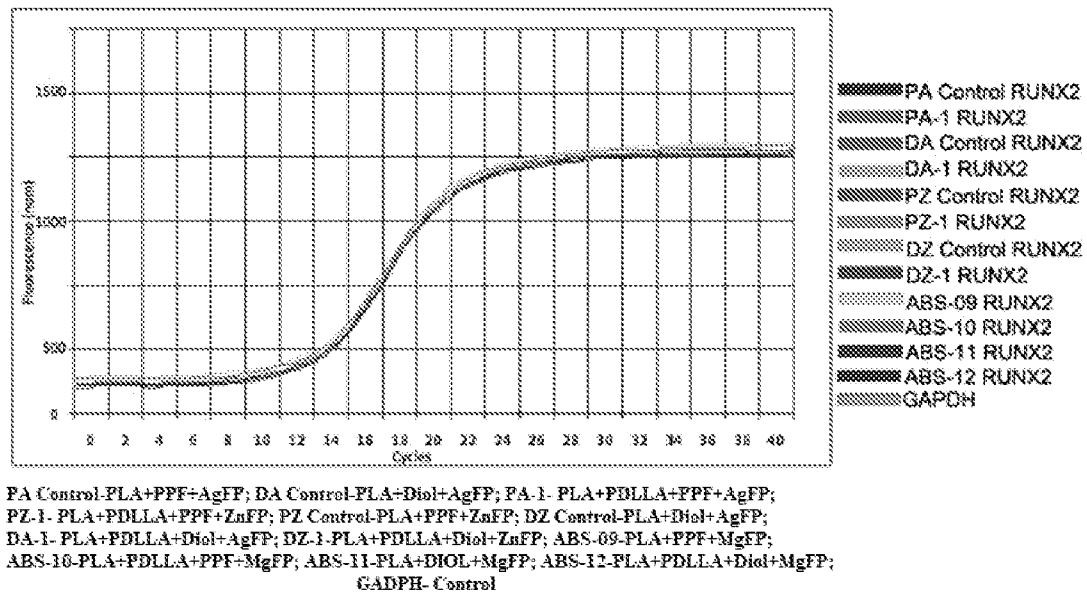


Figure 19

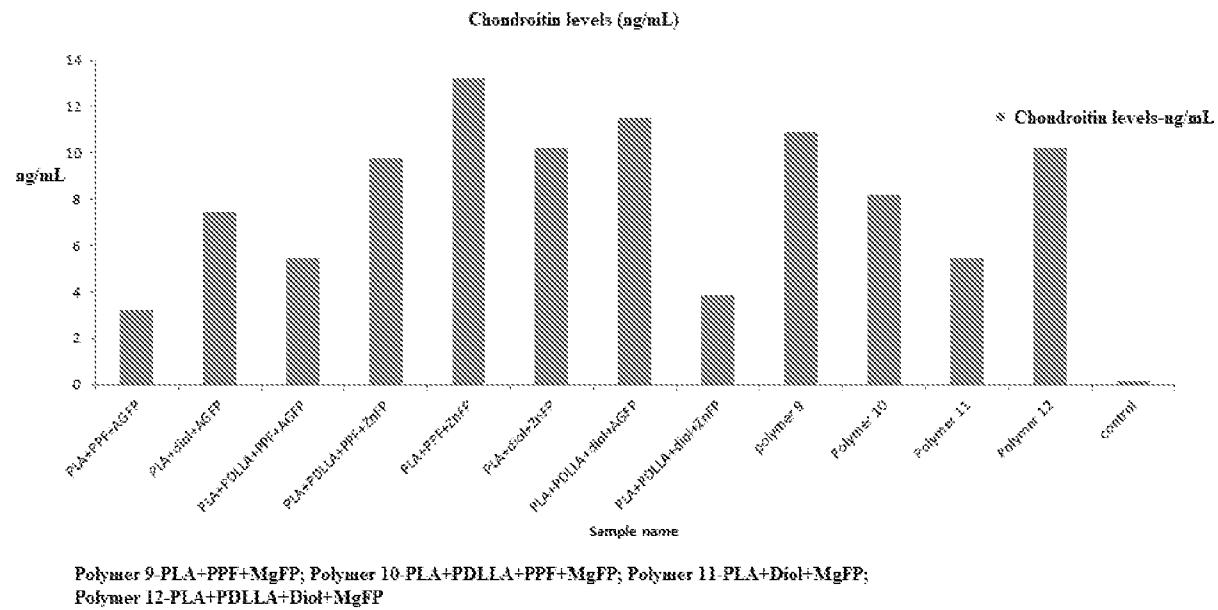


Figure 20

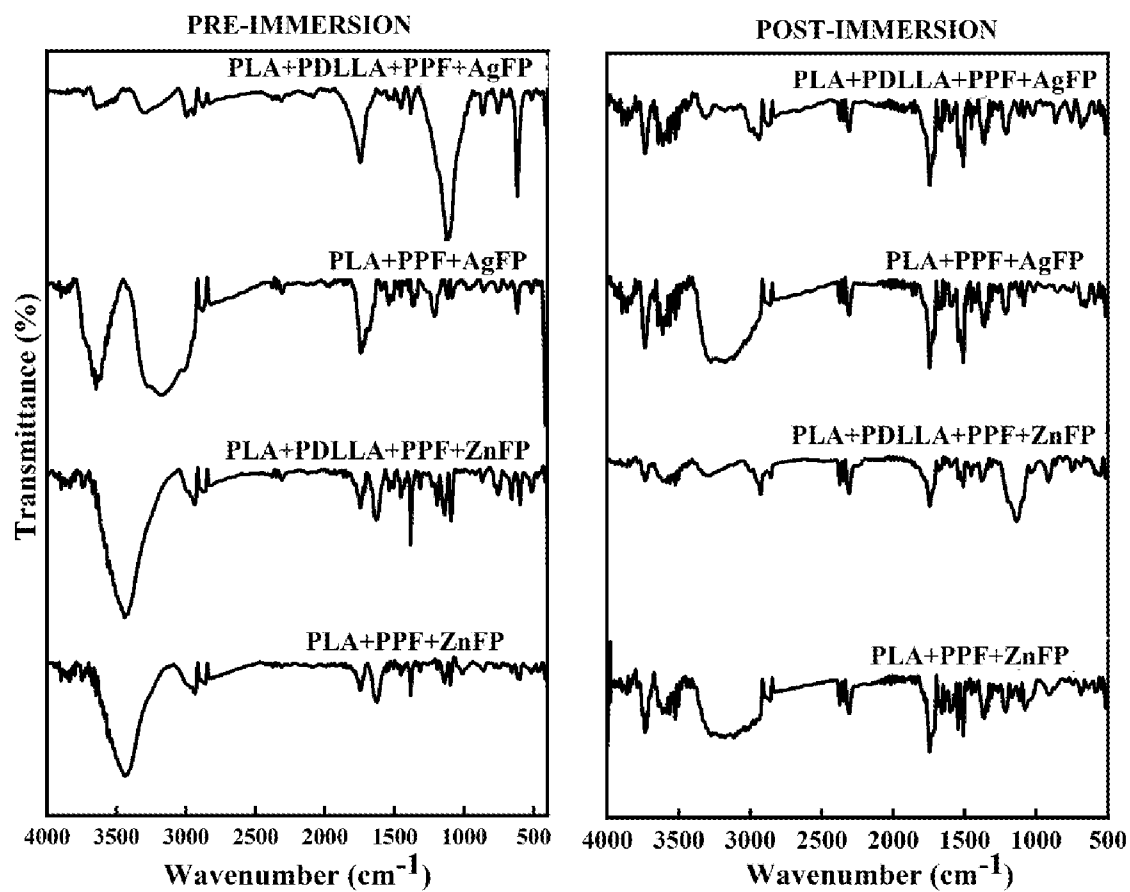


Figure 21

Sample notation:

1-PLA+PPF+ZnFP; 2-PLA+PDLLA+PPF+ZnFP; 3-PLA+PPF+AgFP; 4-PLA+PDLLA+PPF+AgFP

Assignments (cm ⁻¹)	Sample							
	Pre Immersion				Post Immersion			
	1	2	3	4	1	2	3	4
OH Stretch (3200-3500)	3442 (S,B)	3442 (S,B)	3182 (S,B)	3302 (M,B)	3178 (M,B)	3277 (W,B)	3178 (S,B)	3292 (M,B)
CH Stretch (2850-3000)	2862 (M, Sh)	2862 (M, Sh)	2881 (M,Na)	2995 (M,Na)	2862 (M, Sh)	-	2862 (M,Na)	2939 (M,B)
C=O Stretch (1735-1750)	1747 (M,B)	1747 (M,B)	1744 (S,B)	1744 (S,B)	1746 (M,B)	1746 (M,B)	1746 (S,Sh)	1744 (S,B)
C=C Stretch (1630-1680)	1626 (S,B)	1630 (S,B)	1656 (S,B)	1665 (S,B)	1662 (W, Sh)	1680 (W, Sh)	1680 (M,Sh)	1663 (M,Sh)
C-H Bend Asymmetric methyl bend (1450-1470)	1452 (M,B)	1454 (M,B)	1455 (W,Sh)	1454 (M,B)	1454 (M,B)	1456 (W,Sh)	1454 (M,Sh)	1454 (M,Sh)
C-H Bend (1355-1395)	1384 (M, Sh)	1384 (M, Sh)	1364 (M,B)	1383 (M,B)	1363 (M,B)	1381 (M,B)	1362 (M,B)	1363 (M,B)
CO ₃ ²⁻ (1400-1550)	-	1507 (W,Sh)	1541 (W,Sh)	1541 (W,B)	1548 (M,Sh)	1511 (M, Sh)	1546 (M,Sh)	1511 (M, Sh)
P-O Stretch (1060-1170)	1098 (M, Sh)	1094 (M, Sh)	1086 (M,B)	-	1079 (M,B)	1037 (M,B)	1088 (M,B)	1088 (M,B)
P-O-P Asymmetric Stretching (850-1050)	859 (W,B)	-	957 (W,B)	864 (W,B)	912 (W,B)	916 (W,B)	1018 (VW,B)	867 (VW,B)
P-O-P Symmetric Stretching (600-800)	659 (W, Sh)	657 (W, Sh)	617 (M,Sh)	617 (S,Sh)	688 (W, B)	690 (W, B)	654 (M,B)	687 (M,B)
P-O Bend (500-560)	518 (W,B)	516 (W,B)	517 (W,B)	517 (W,B)	518 (M, Sh)	516 (M, Sh)	516 (M,Sh)	518 (M,Sh)

(S-Strong, M-Medium, W-Weak, VW-Very weak, VS-Sharp, Sh-Sharp, B-Broad, Na-Narrow)

Figure 21a

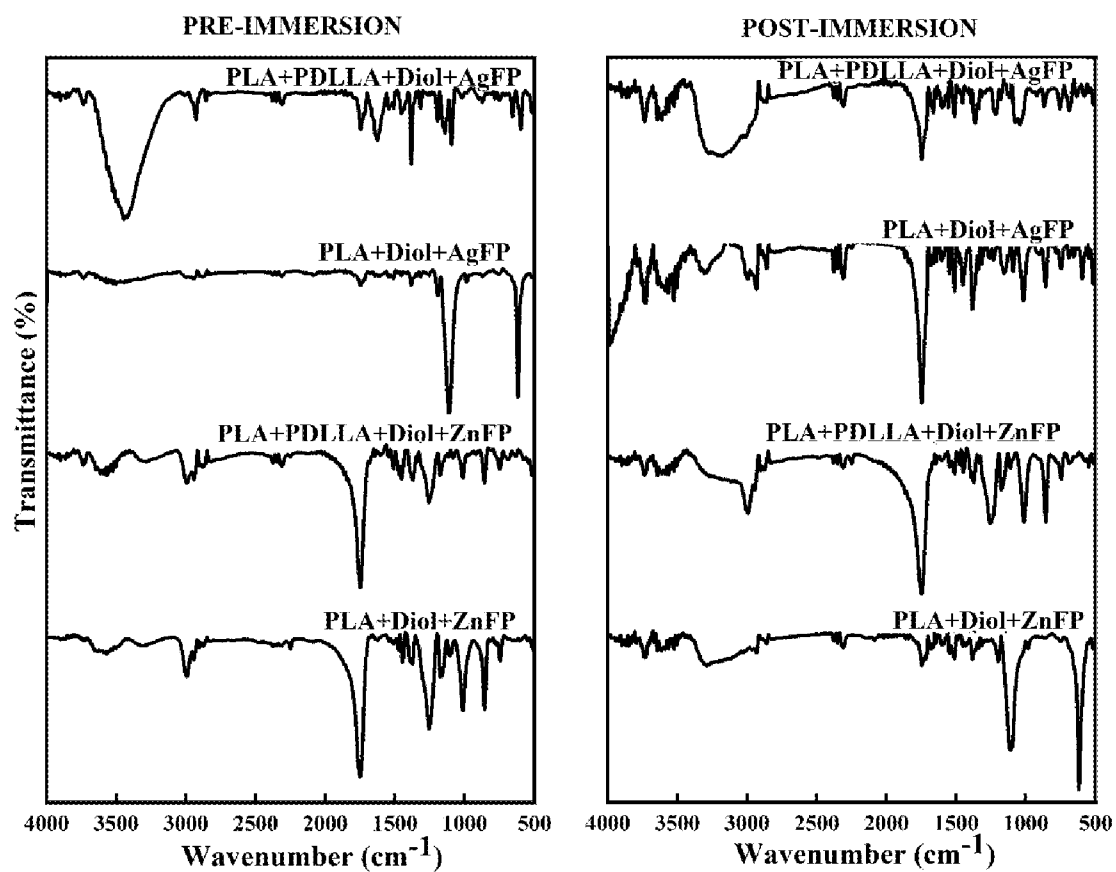


Figure 22

Sample Notation:**1-PLA+Diol+ZnFP; 2-PLA+PDLLA+Diol+ZnFP; 3-PLA+Diol+AgFP; 4-PLA+PDLLA+Diol+AgFP**

Assignments (cm ⁻¹)	Sample							
	Pre Immersion				Post Immersion			
	1	2	3	4	1	2	3	4
OH Stretch (3200-3500)	3313 (W,B)	3587 (W,B)	3502 (W,B)	3443 (S,B)	3274 (M,B)	3586 (W,B)	3586 (M,B)	3645 (M,B)
CH Stretch (2850-3000)	2993 (M, Sh)	2993 (M,Na)	2943 (M,B)	2928 (M,Sh)	2859 (W, Sh)	2995 (M,Na)	2931 (M,Sh)	2876 (M,Na)
C=O Stretch (1735-1750)	1750 (S,B)	1748 (VS,B)	1746 (W,B)	1745 (S,Sh)	1745 (M,B)	1747 (S,Sh)	1746 (S,B)	1747 (S,Sh)
C=C Stretch (1630-1680)	1664 (VW,Sh)	1630 (S,B)	-	1626 (M,B)	1680 (VW, Sh)	1680 (W, Sh)	1604 (W,B)	1663 (W,Sh)
C-H Bend Asymmetric methyl bend (1450-1470)	1474 (W,B)	1453 (M,Sh)	-	1454 (M, Sh)	1452 (W,B)	1449 (W,Sh)	1452 (M,Sh)	1455 (W, Sh)
C-H Bend (1355-1395)	1375 (M, B)	1372 (M, B)	1384 (W,Sh)	1383 (S,Sh)	1383 (M,B)	1373 (M,B)	1388 (M,B)	1363 (M,B)
CO ₃ ²⁻ (1400-1550)	1544 (W,B)	1547 (W, Sh)	1544 (W,B)	1509 (W,Sh)	1511 (M,B)	1546 (M, Sh)	1549 (M,Sh)	1510 (M,Sh)
P-O Stretch (1060-1170)	1174 (M, B)	1177 (M, B)	1113 (VS,Sh)	1195 (M,Sh)	1198 (W,Sh)	1175 (M,B)	1155 (W,B)	1179 (W,B)
P-O-P Asymmetric Stretch stretching (850-1050)	857 (M,B)	858 (M,Sh)	987 (W,B)	872 (W,B)	-	858 (M,Sh)	857 (W,B)	867 (M,Sh)
P-O-P Symmetric Stretching (600-800)	745 (M, Br)	747 (M, Sh)	619 (VS,Sh)	658 (W,Sh)	618 (VS,Sh)	746 (VW, B)	689 (W,B)	689 (W,B)
P-O Bend (500-560)	505 (W,B)	517 (M,Sh)	518 (W,B)	597 (M,Sh)	518 (W, Sh)	517 (W, Sh)	518 (M,Sh)	581 (W,B)

(S-Strong, M-Medium, W-Weak, VW-Very weak; VS-Very Sharp, Sh-Sharp, M-Medium, B-Broad, Na-Narrow)

Figure 22a

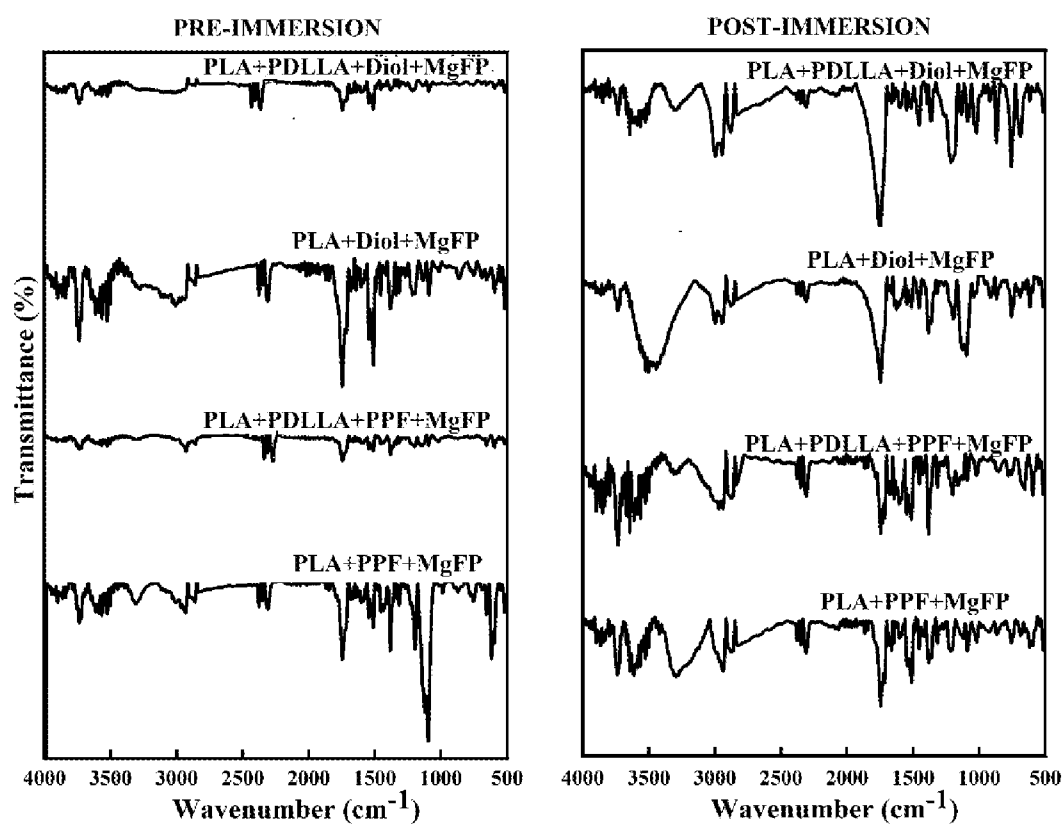


Figure 23

Sample notation:

1-PLA+PPF+MgFP; 2-PLA+PDLLA+PPF+MgFP; 3-PLA+Diol+MgFP; 4-PLA+PDLLA+Diol+MgFP

Assignments (cm ⁻¹)	Sample							
	Pre Immersion				Post Immersion			
	1	2	3	4	1	2	3	4
OH Stretch (3200-3500)	3309 (W,B)	3309 (W,B)	3588 (W,B)	3011 (W,B)	3291 (S,B)	3291 (W,B)	3445 (W,B)	3292 (M,B)
CH Stretch (2850-3000)	2861 (W,Sh)	2929 (W,Sh)	2861 (W,Na)	2861 (VW)	2823 (M,Sh)	2971 (M,Sh)	2879 (M,B)	2881 (M,B)
C=O Stretch (1735-1750)	1747 (M,B)	1745 (M,B)	1747 (S,Sh)	1746 (M,B)	1746 (M,V Sh)	1745 (M,V Sh)	1746 (S,B)	1745 (S,Sh)
C=C Stretch (1610-1680)	1626 (W,B)	1662 (W,B)	1605 (W,B)	1662 (W,B)	1664 (W,Sh)	1664 (W,Sh)	1626 (W,Sh)	16623 (W,Sh)
C-H Bend Asymmetric methyl bend (1450-1470)	1435 (W,Sh)	1455 (W,B)	1455 (W,Sh)	1455 (M,B)	1454 (W,Sh)	1453 (W,Sh)	1454 (W,B)	1455 (M,Sh)
C-H Bend (1355-1395)	1384 (M,Sh)	1388 (W,Sh)	1383 (M,B)	1380 (W,B)	1383 (M,Sh)	1384 (M,Sh)	1384 (M,B)	1367 (M,Sh)
CO ₃ ²⁻ (1400-1550)	1546 (W,Sh)	1546 (W,Sh)	1546 (M,Sh)	1547 (W,Sh)	1548 (M,Sh)	1550 (M,Sh)	1550 (W,Sh)	1550 (W,Sh)
P-O Stretch (1060-1170)	1093 (S,Sh)	1093 (W,Sh)	1090 (W,Sh)	1091 (W,Sh)	1089 (M,B)	1090 (M,Sh)	1097 (M,Sh)	1087 (M,Sh)
P-O-P Asymmetric Stretch stretching (850-1050)	870 (W,B)	-	864 (W,B)	-	867 (W,B)	854 (W,B)	867 (W,B)	867 (M,Sh)
P-O-P Symmetric Stretching (600-800)	618 (M,S)	657 (W,Sh)	690 (W,B)	690 (W,B)	616 (M,B)	687 (M,B)	691 (W,B)	690 (M,B)
P-O Bend (500-560)	518 (W,Sh)	518 (W,Sh)	517 (W,Sh)	518 (W,Sh)	518 (M,Sh)	518 (M,Sh)	517 (Sh)	518 (M,Sh)

(S-Strong, M-Medium, W-Weak, VW-Very weak; VS-Very Sharp, Sh-Sharp, M-Medium, B-Broad, Na-Narrow)

Figure 23a

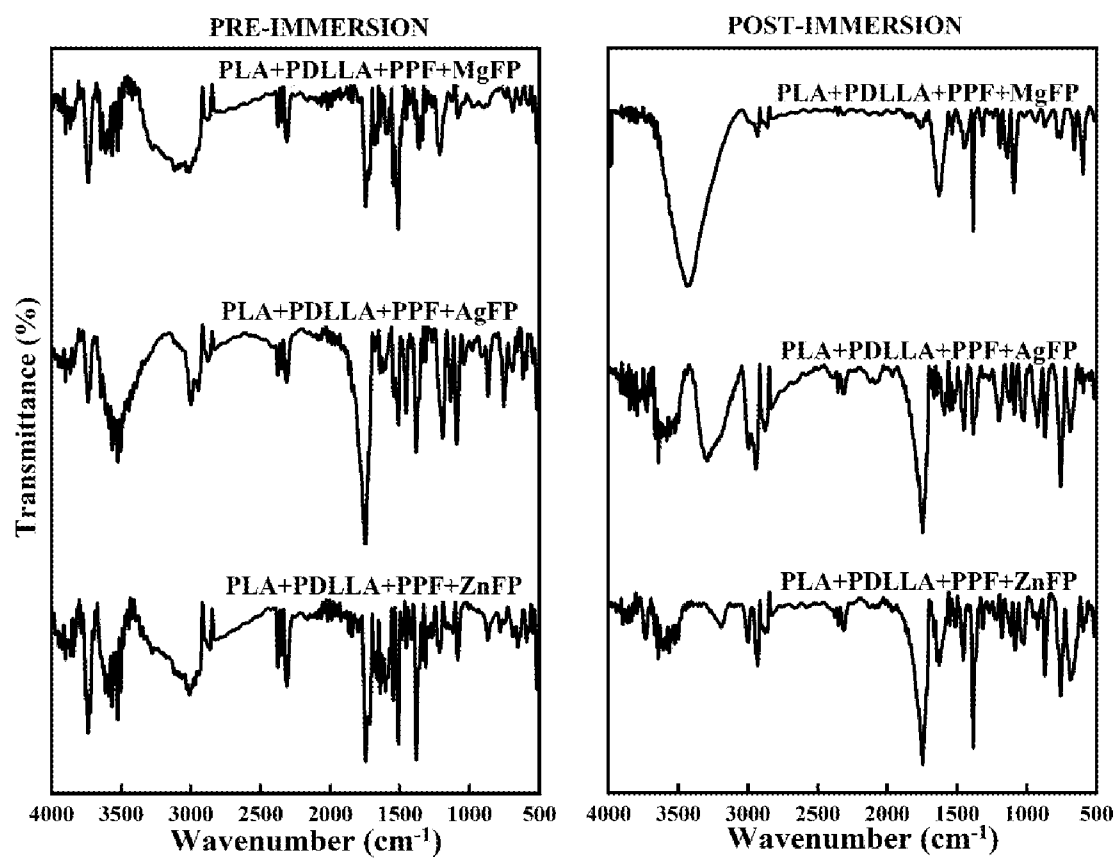


Figure 24

Sample Notation:**1-PLA+PDLLA+PPF+ZnFP; 2-PLA+PDLLA+PPF+AgFP; 3-PLA+PDLLA+PPF+MgFP**

Assignments (cm ⁻¹)	Sample					
	Pre Immersion			Post Immersion		
	1	2	3	1	2	3
OH Stretch (3200-3500)	3613 (VW,B)	3503 (VW,B)	3612 (VW,B)	3645 (M,B)	3642 (M,B)	3436 (S,B)
CH Stretch (2850-3000)	2861 (VW,B)	2880 (VW,B)	2880 (W,B)	2881 (M,B)	2878 (M,B)	2860 (W,B)
C=O Stretch (1735-1750)	1746 (M,B)	1748 (M,B)	1746 (M,Sh)	1745 (VS,Sh)	1745 (VS,Sh)	1765 (VW,B)
C=C Stretch (1630-1680)	1662 (VW,B)	1624 (VW,B)	1662 (W,B)	1663 (W,Sh)	1665 (W,Sh)	1630 (M,B)
C-H Bend Asymmetric methyl bend (1450-1470)	1455 (M,B)	1455 (M,Sh)	1454 (W,Sh)	1455 (M,Sh)	1451 (M,Sh)	1447 (W,B)
C-H Bend (1355-1395)	1380 (W,B)	1385 (M,B)	-	1367 (M,Sh)	1383 (M,Sh)	1316 (M,Na)
CO ₃ ²⁻ (1400-1550)	1547 (W,Sh)	1547 (W,Sh)	1511 (M,Sh)	1550 (W,Sh)	1589 (W,Sh)	1536 (W,Sh)
P-O Stretch (1060-1170)	1091 (W,Sh)	1094 (M,Sh)	1083 (W,Na)	1087 (M,Sh)	1090 (M,Sh)	1093 (S,Na)
P-O-P Asymmetric Stretch stretching (850-1050)	-	870 (W,B)	-	867 (M,Sh)	867 (M,Sh)	871 (VW,B)
P-O-P Symmetric Stretching (600-800)	690 (W,B)	691 (VW,B)	690 (W,B)	690 (M,Sh)	688 (M,B)	659 (M,Sh)
P-O Bend (500-560)	518 (W,Sh)	518 (W,Sh)	518 (W,Sh)	518 (M,Sh)	517 (M,Sh)	597 (S,Sh)

(S-Strong, M-Medium, W-Weak, VW-Very weak; VS-Very Sharp, Sh-Sharp, M-Medium, B-Broad, Na-Narrow)

Figure 24a

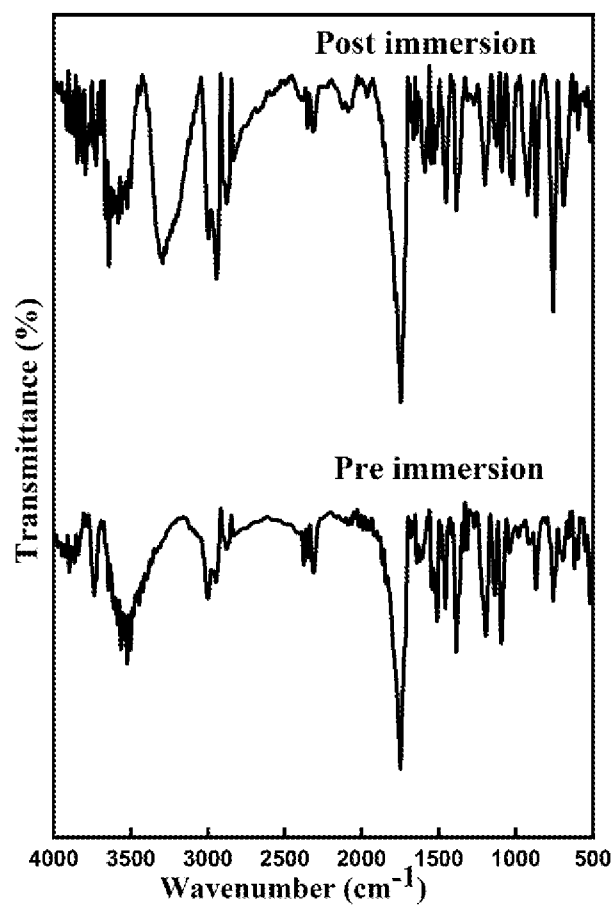


Figure 25

STRIP	Assignments (cm ⁻¹)										
	OH Stretch {3200-3500}	CH Stretch {2850-3000}	C=O Stretch {1735-1750}	C=C Stretch {1630-1680}	C-H Bend Asymmetric methyl bend {1450-1470}	C-H Bend {1355-1395}	CO ₃ ²⁻ (1400-1550)	P-O Stretch {1060-1170}	P-O-P Asymmetric Stretch {850-1050}	P-O-P Symmetric Stretching {600-800}	P-O Bend {500-560}
PRE	3507	2877	1754	1662	1456	1384	1547	1093	871	682	518
IMMERSION	(VW,B)	(VW,B)	(M,B)	(VW,B)	(M,B)	(W,B)	(W,Sh)	(M,Sh)	(W,B)	(VW,B)	(W,Sh)
POST	3642	2878	1743	1664	1455	1385	1586	1099	867	688	517
IMMERSION	(M,B)	(M,B)	(VS,Sh)	(W,Sh)	(M,Sh)	(W,B)	(M,Sh)	(M,Sh)	(M,Sh)	(M,B)	(M,Sh)

(S-Strong, M-Medium, W-Weak, VW-Very weak; VS-Very Sharp, Sh-Sharp, M-Medium, B-Broad, Na-Narrow)

Figure 25a

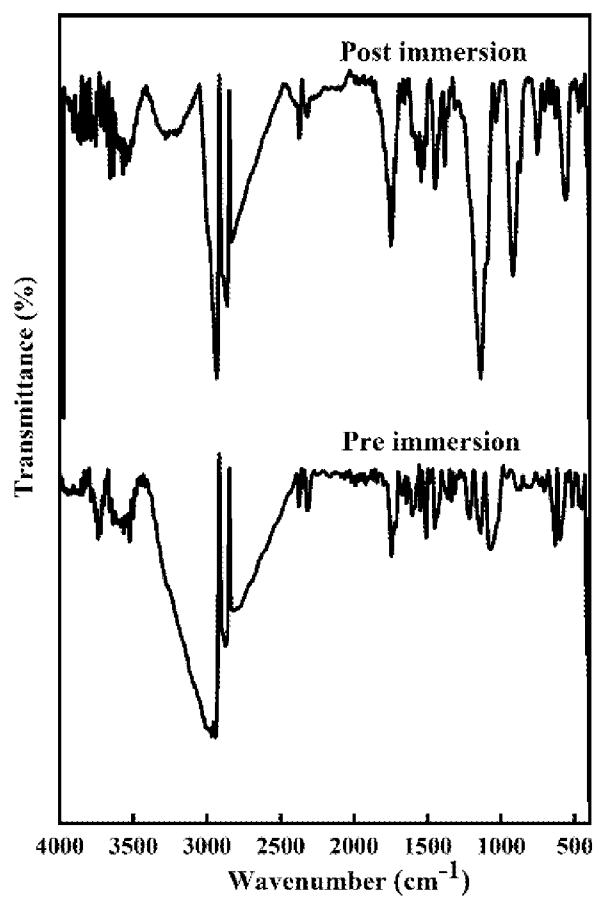
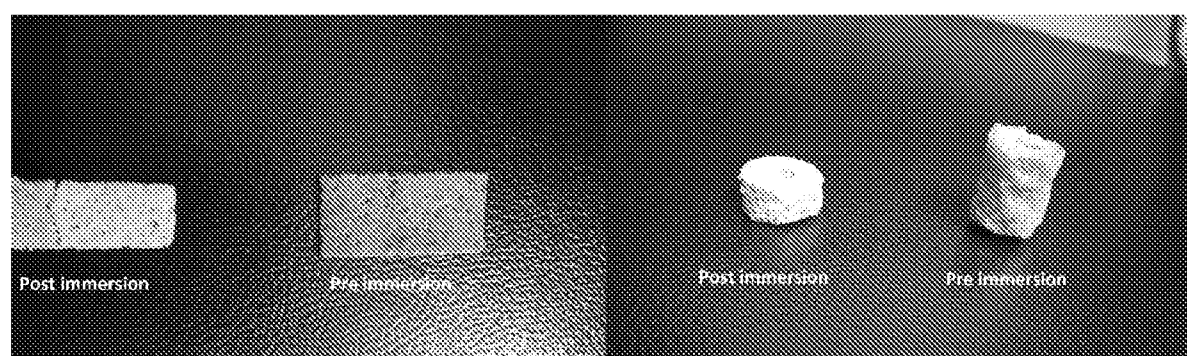


Figure 26

CYLINDER	Assignments (cm ⁻¹)										
	OH Stretch {3200-3500}	CH Stretch {2850-3000}	C=O Stretch {1735-1750}	C=C Stretch {1630-1680}	C-H Bend Asymmetric methyl bend {1450-1470}	C-H Bend {1355-1395}	CO ₃ ²⁻ (1400-1550)	P-O Stretch (1060-1170)	P-O-P Asymmetric Stretch stretching (850-1050)	P-O-P Symmetric Stretching {600-800}	P-O Bend {500-560}
PRE	3566	2876	1746	1643	1452	1339	1510	1076	891	634	518
IMMERSION	(M,B)	(S, Na)	(M,Sh)	(W,Sh)	(M,Sh)	(W,Sh)	(M,SH)	(M,B)	(VW,B)	(M,Na)	(W,Sh)
POST	3262	2862	1751	-	1449	1364	1545	1139	920	664	564
IMMERSION	(W,B)	(M,Na)	(M,B)		(W,B)	(W,Sh)	(M,B)	(S,B)	(M,B)	(VW,B)	(M,B)

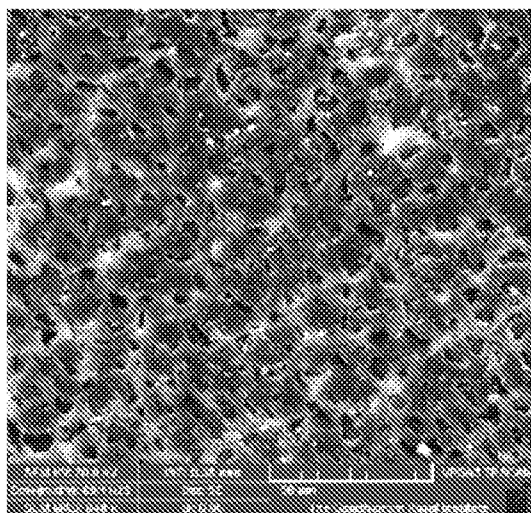
(S-Strong, M-Medium, W-Weak, VW-Very weak; VS-Very Sharp, Sh-Sharp, M-Medium, B-Broad, Na-Narrow)

Figure 26a

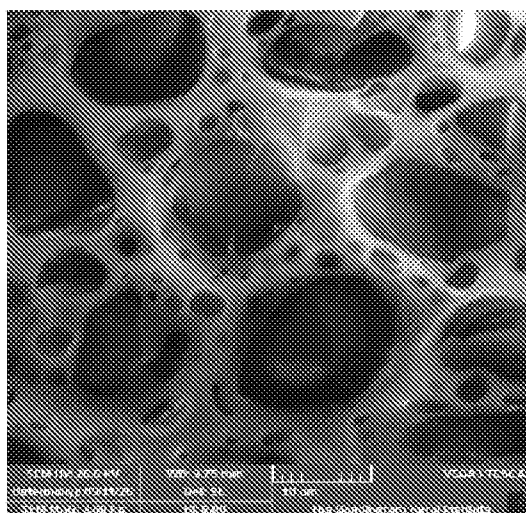


Post immersion and Pre immersion photographs of the strip and the cylinder

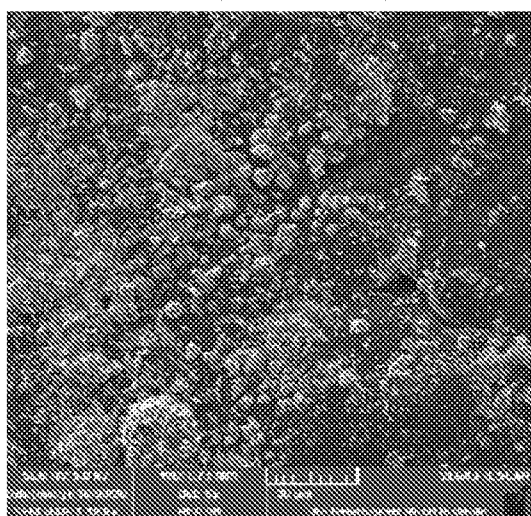
Figure 27



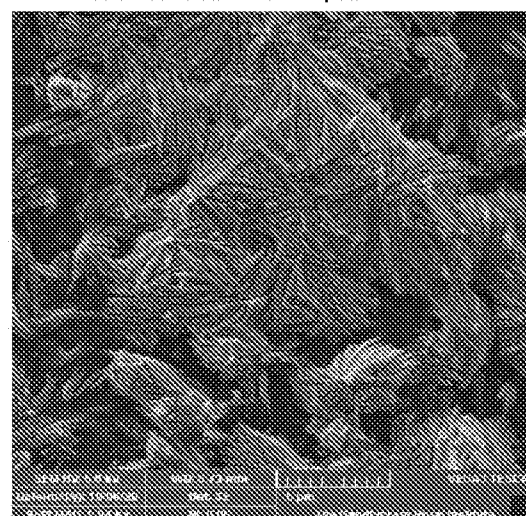
Pre immersion at 20µm



Pre immersion at 5µm



Post immersion at 20µm



Post immersion at 5µm

Figure 28

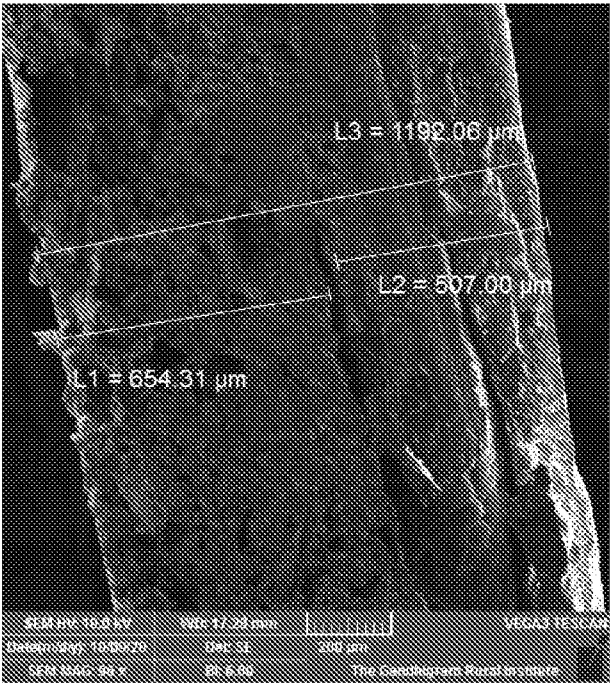


Figure 28a

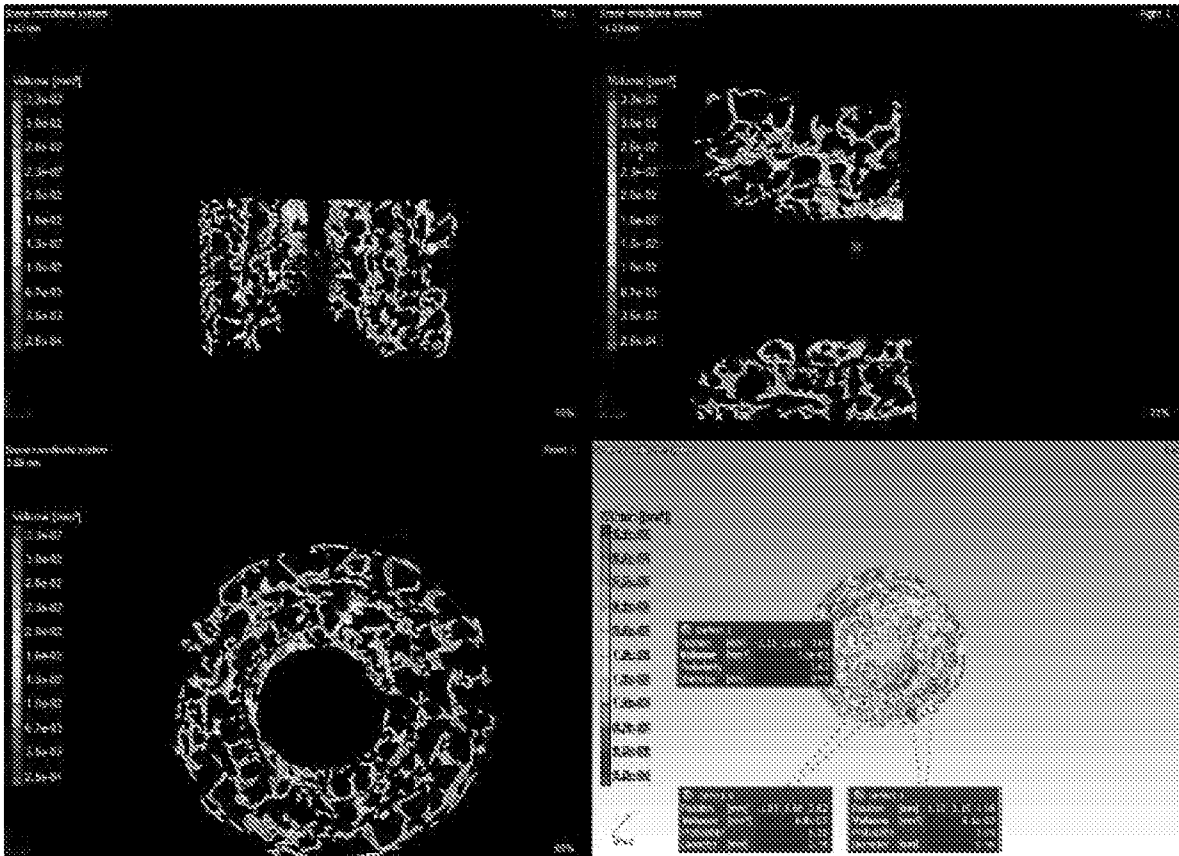


Figure 29

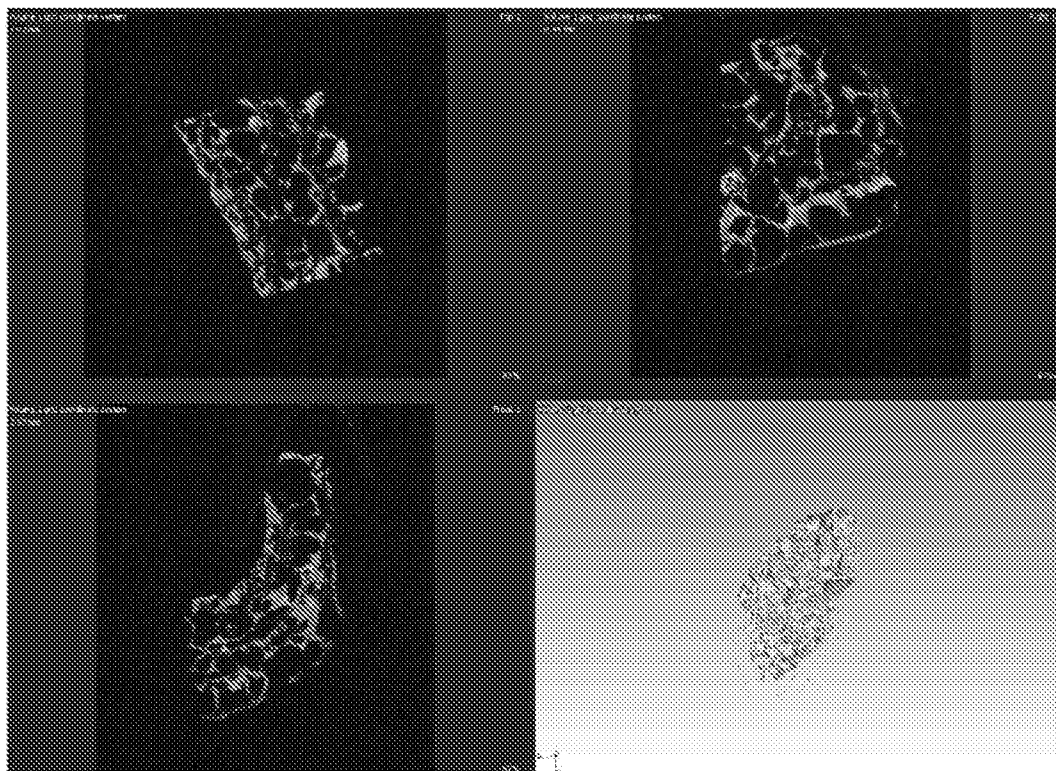


Figure 29a

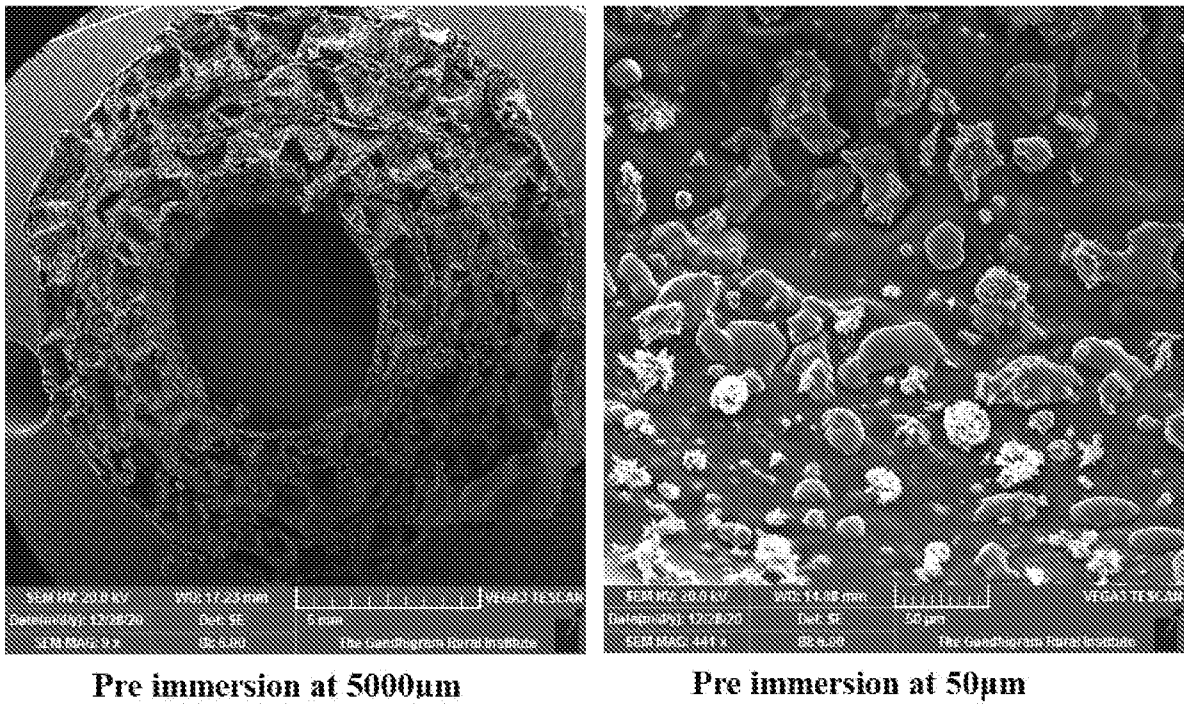
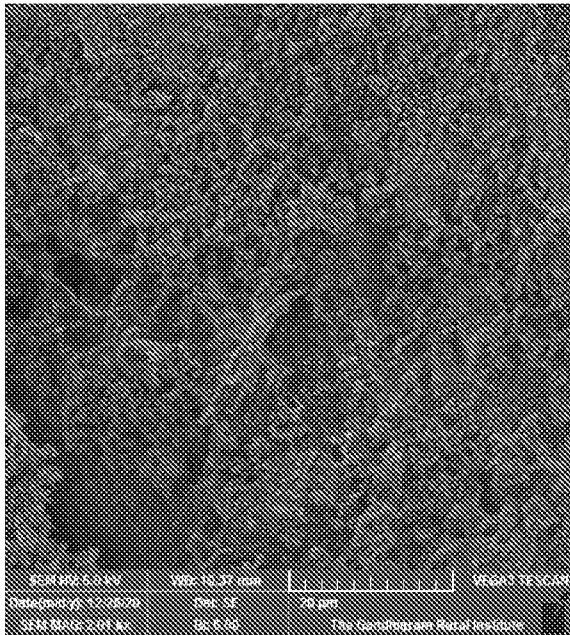
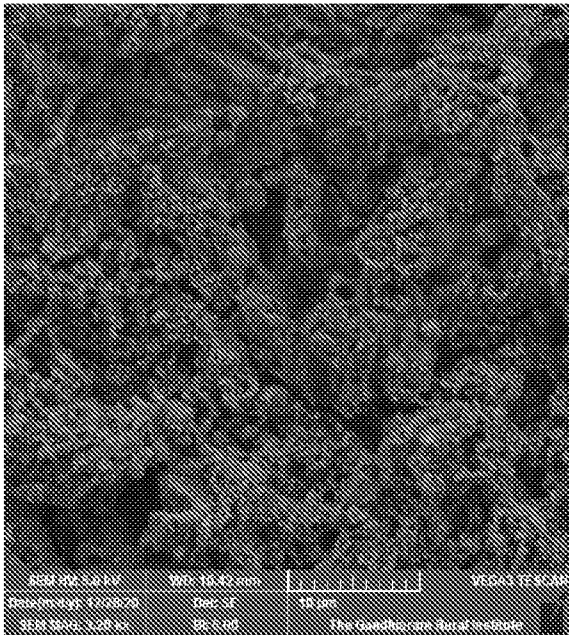


Figure 30



Post immersion at 20µm



Post immersion at 10µm

Figure 30a

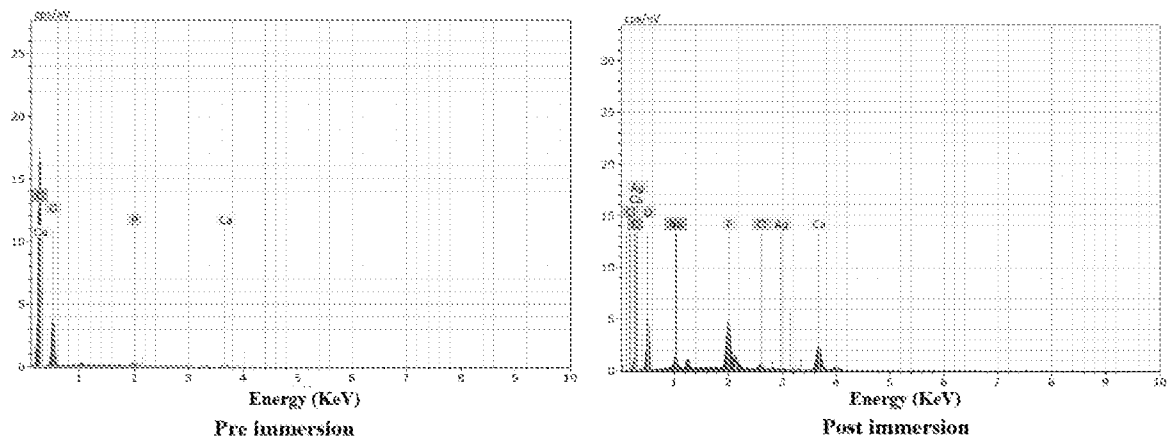


Figure 30b

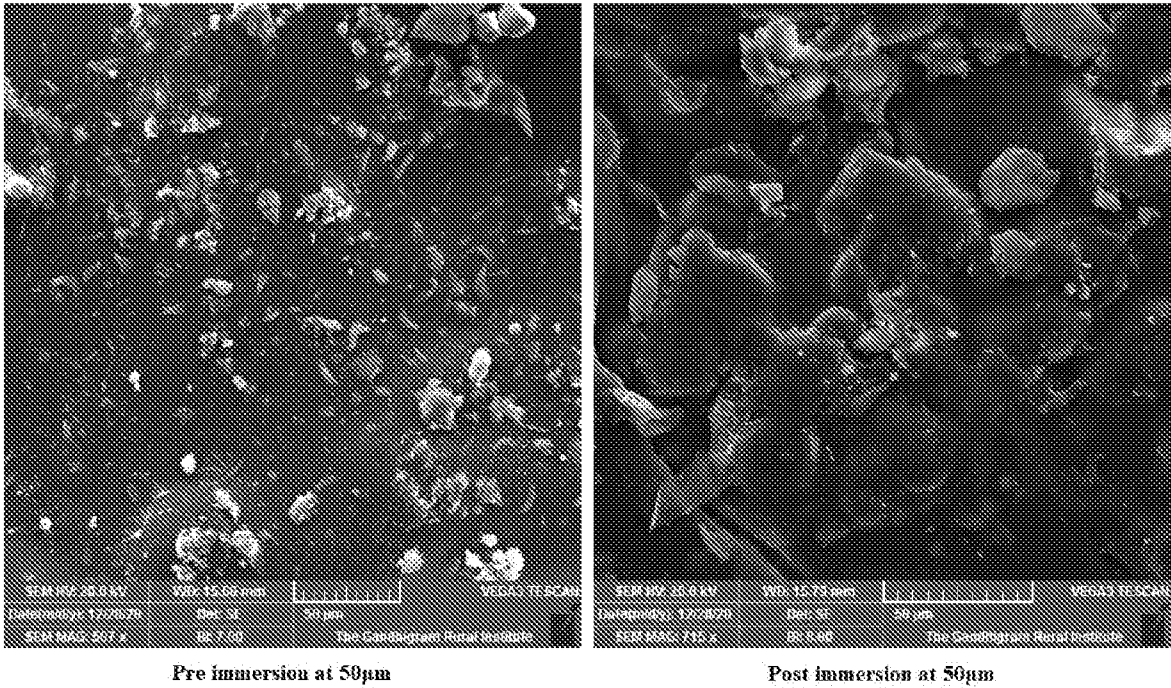


Figure 31

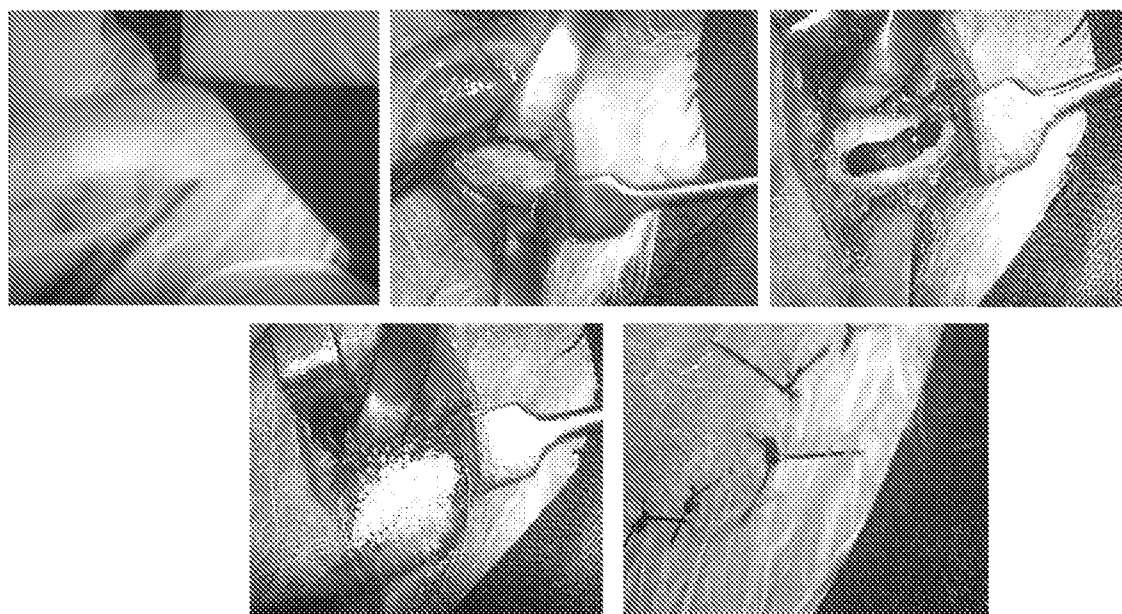


Figure 32

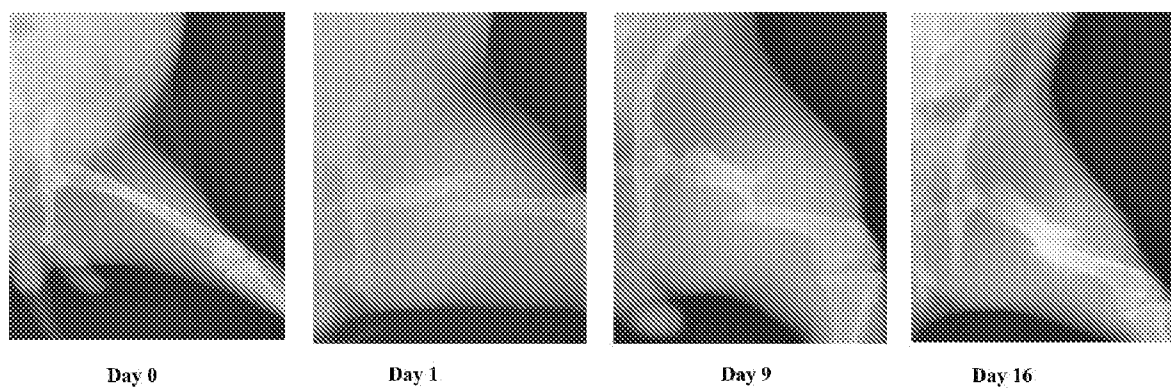


Figure 33



Figure 34

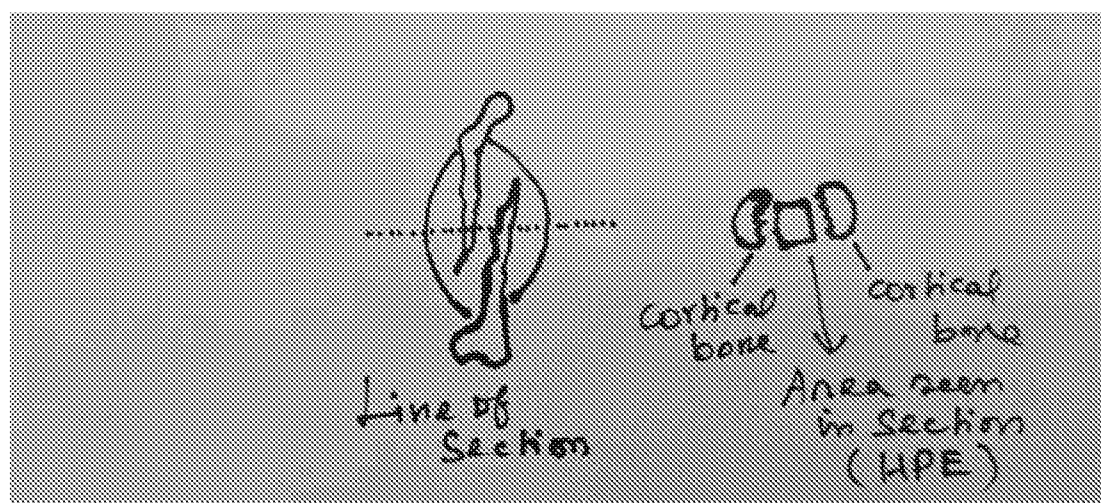
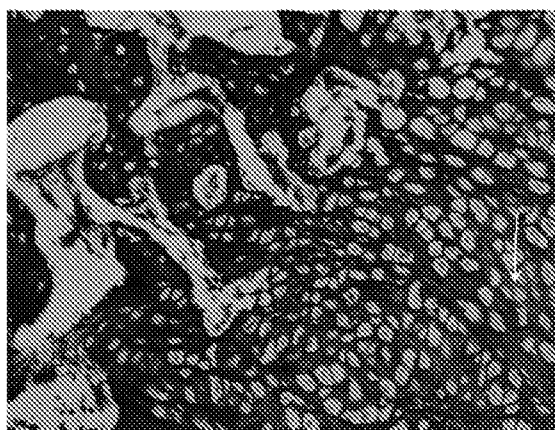
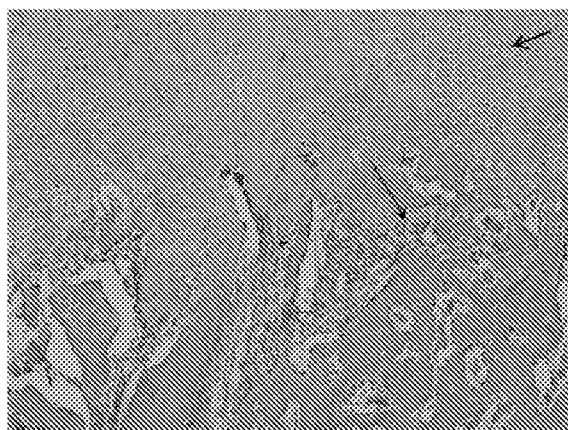


Figure 35



Yellow arrow- Cartilage
Green Arrow- Composite material
Red arrow- Woven bone

VON KOSSA STAIN



Thick black arrow-Cartilage
Thick red arrow-Osteoid
Thin long black arrow- Composite material
Thin long red arrow- Woven bone
Red box- RIM of osteoblastic cells

HEMATOXYLIN AND EOSIN STAIN

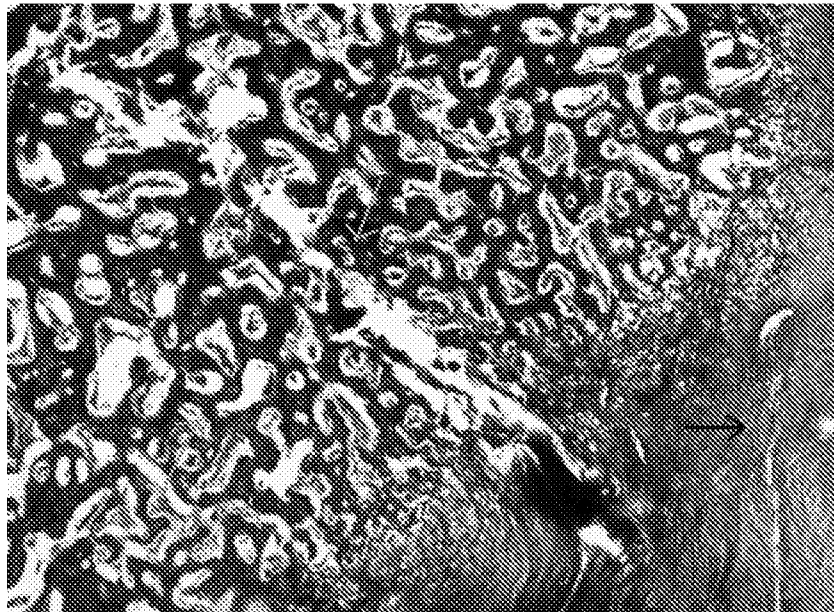
Figure 36 A&B



- Mature lamellar bone in continuity with the composites
- Corticotomy by the surgeon
- Another fragment of fracture femur
- Woven bone

Modified Tetrachrome stain

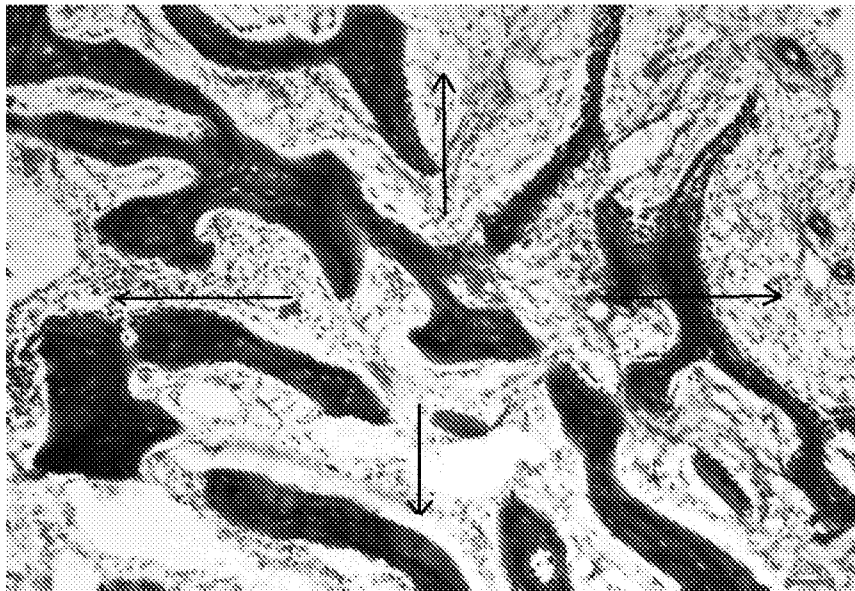
Figure 37A



→ Cartilage getting ossified
→ Woven bone

Modified Tetrachrome stain

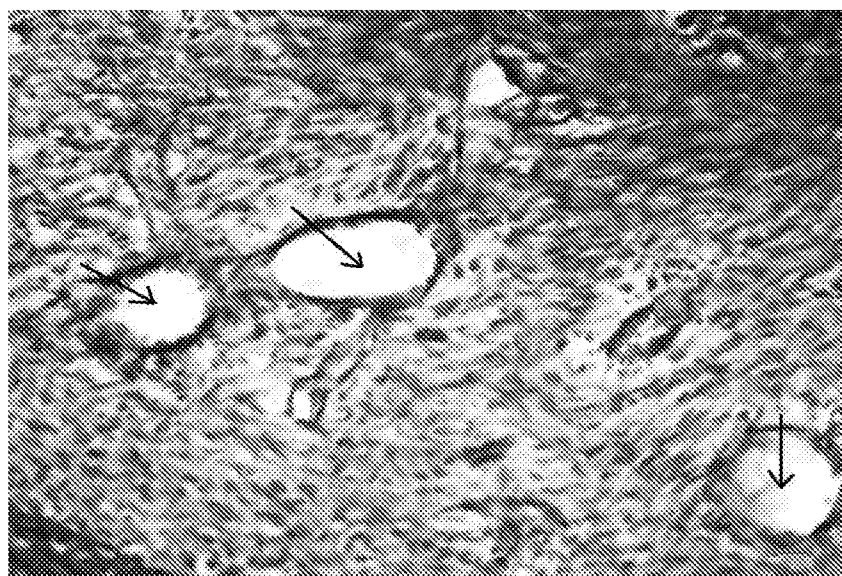
Figure 37b



→ Abundant osteoblasts and newly laid osteoid

Modified Tetrachrome stain

Figure 37c



→ Neovascularization

→ Fibroblasts

Modified Tetrachrome Stain

Figure 37d



Figure 38

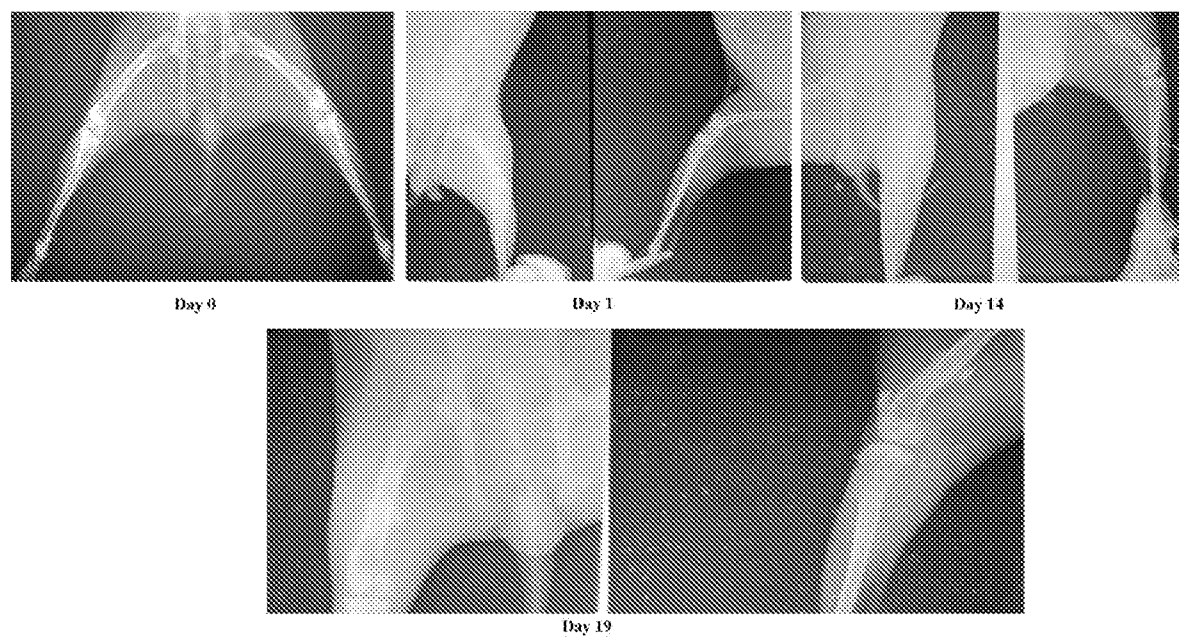


Figure 39a

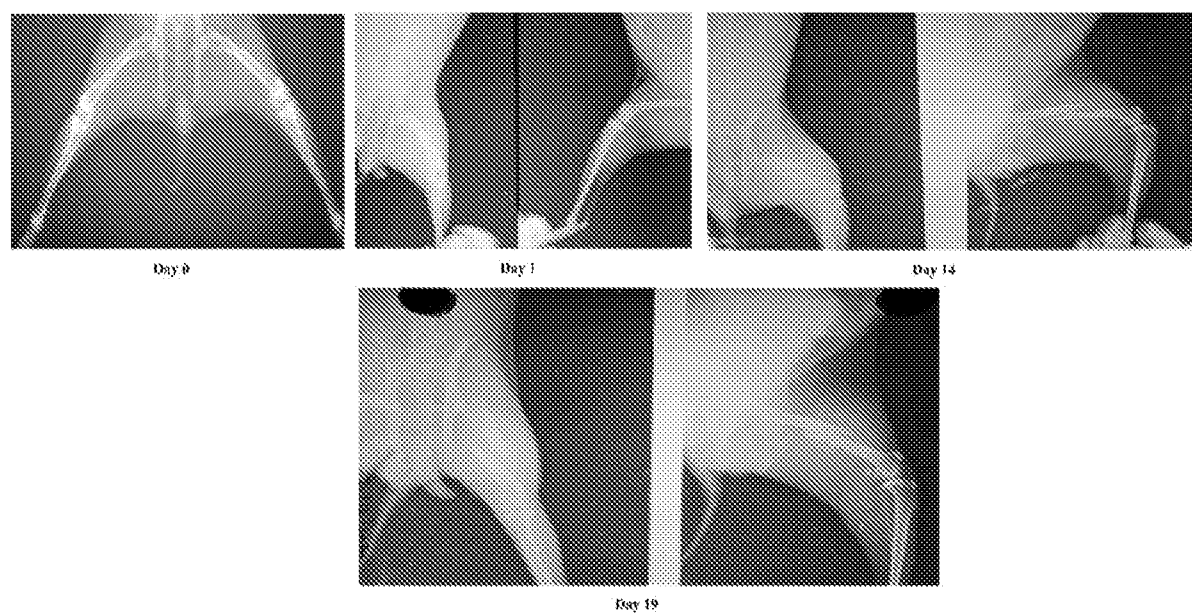


Figure 39b

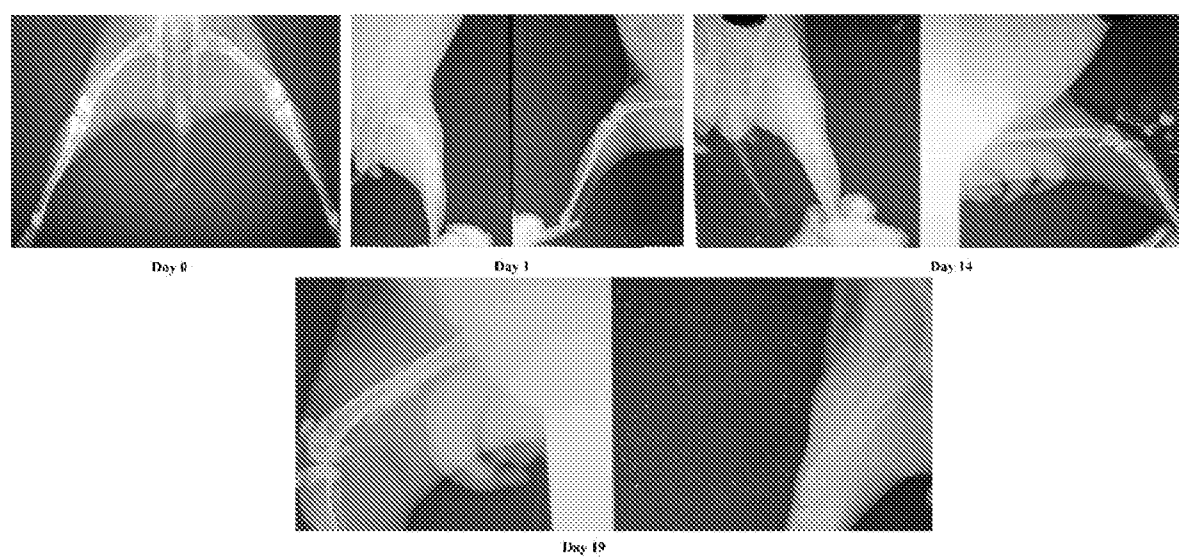


Figure 39 c



Figure 40 a

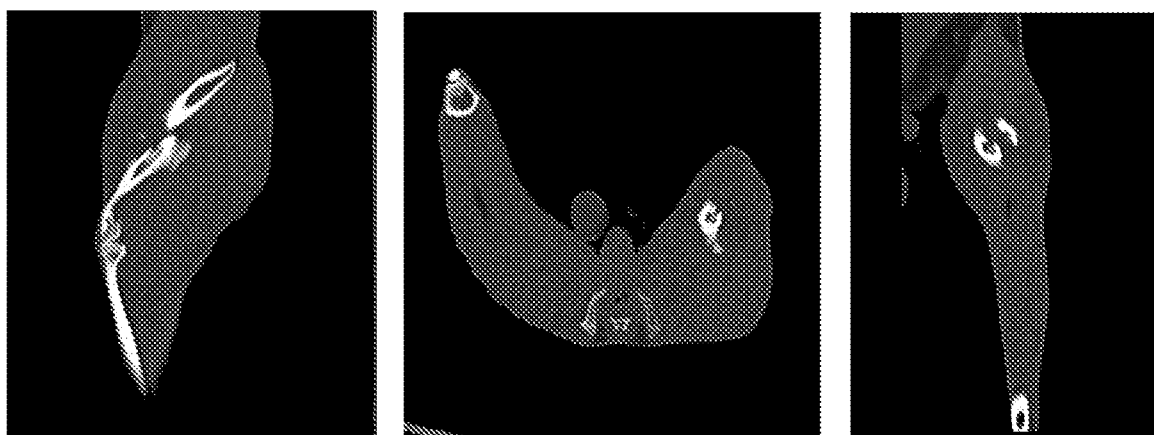


Figure 40 b

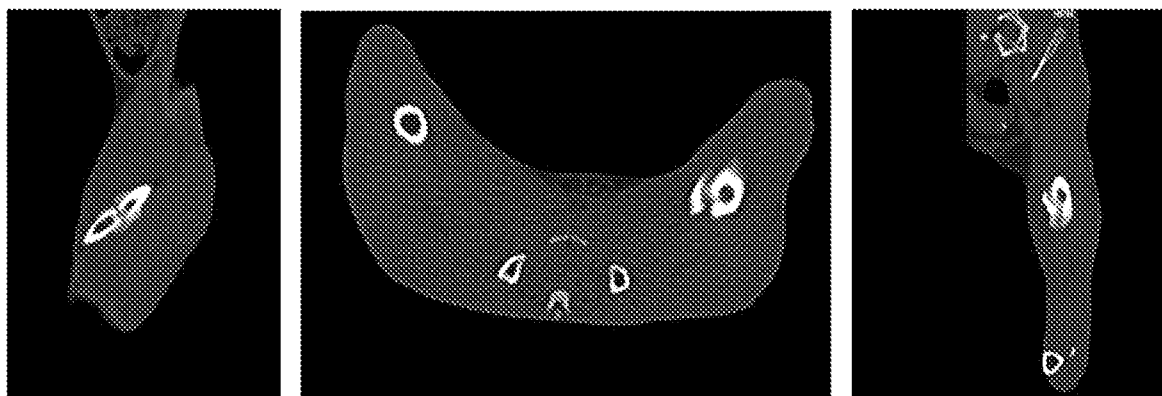


Figure 40c

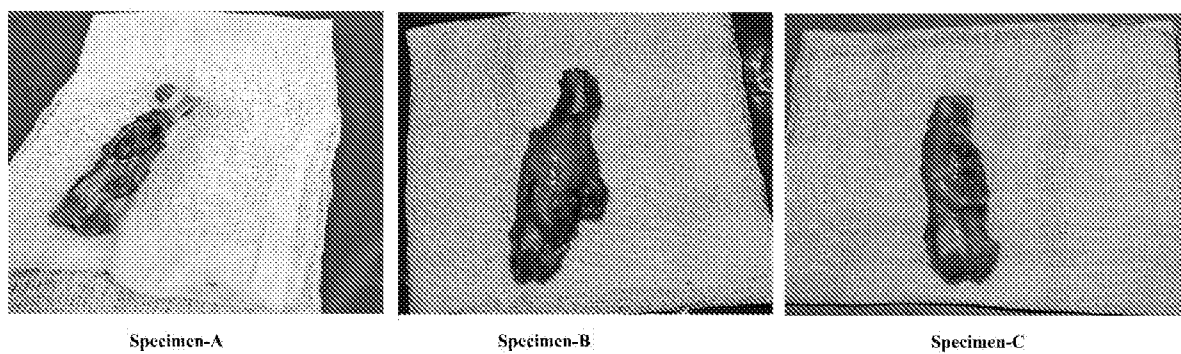


Figure 41

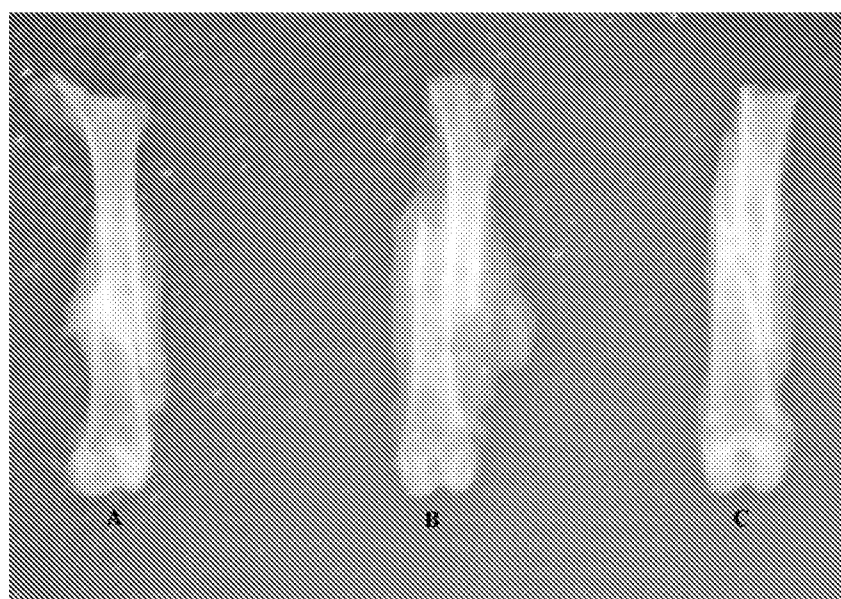


Figure 42 a

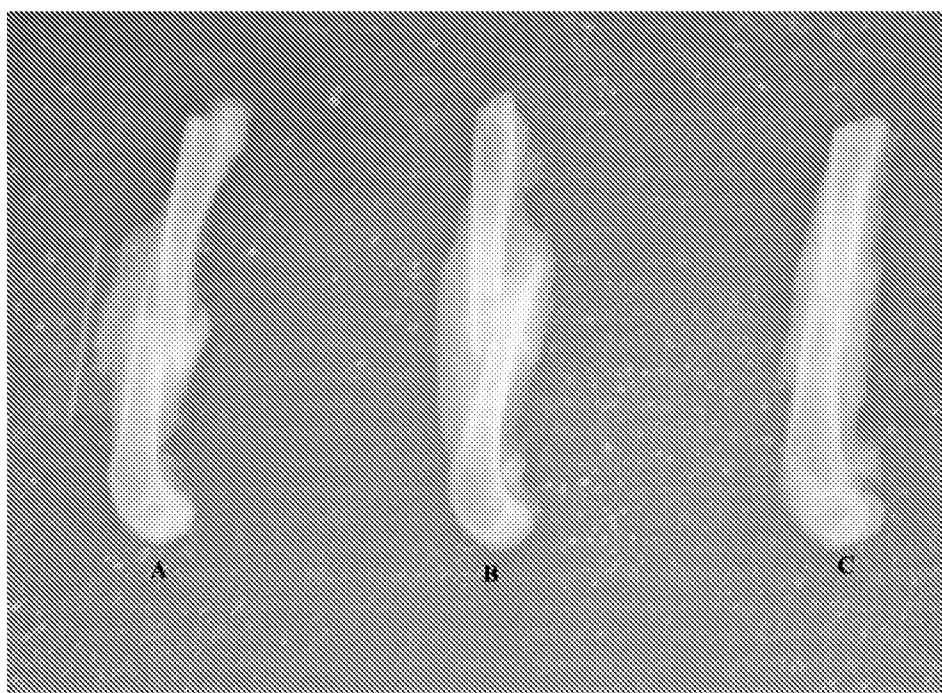


Figure 42b

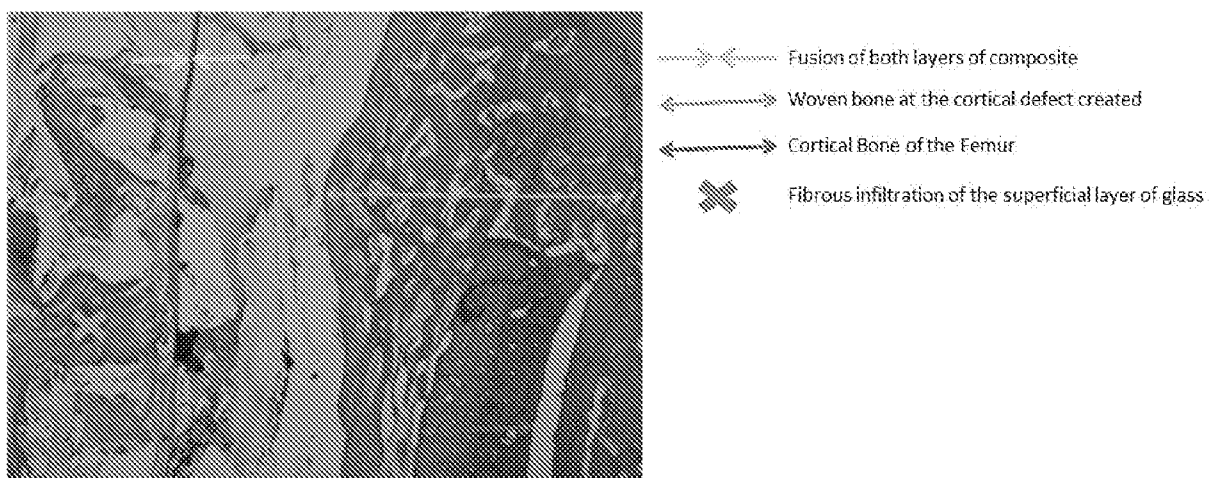
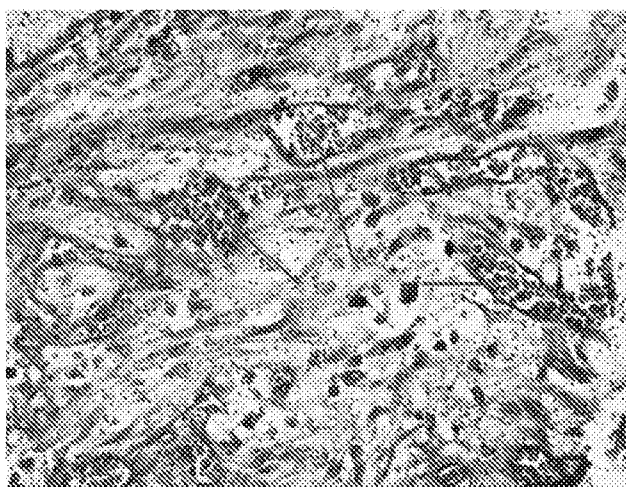


Figure 43a



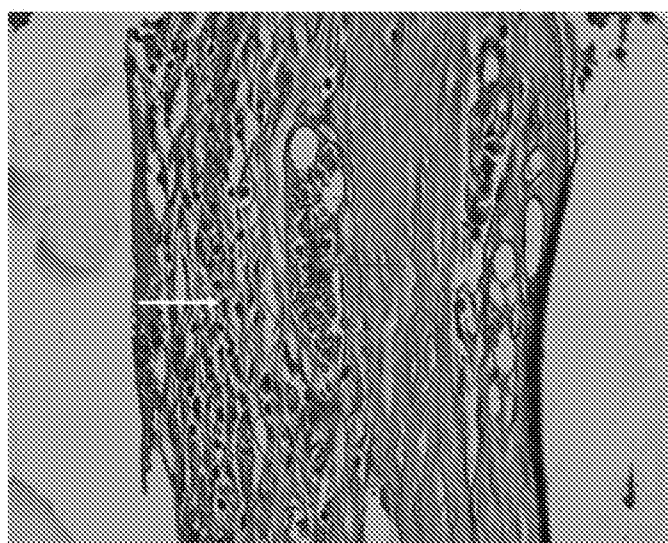
===== Abundance of Neo Vascularisation
of the superficial layer of composite
at higher magnification.

Figure 43b



.....→ Fibrous infiltration of the glass composite

Figure 43c



- > Neo vascularisation in higher magnification
- > Freshly infiltrated young fibroblasts

Figure 43 d

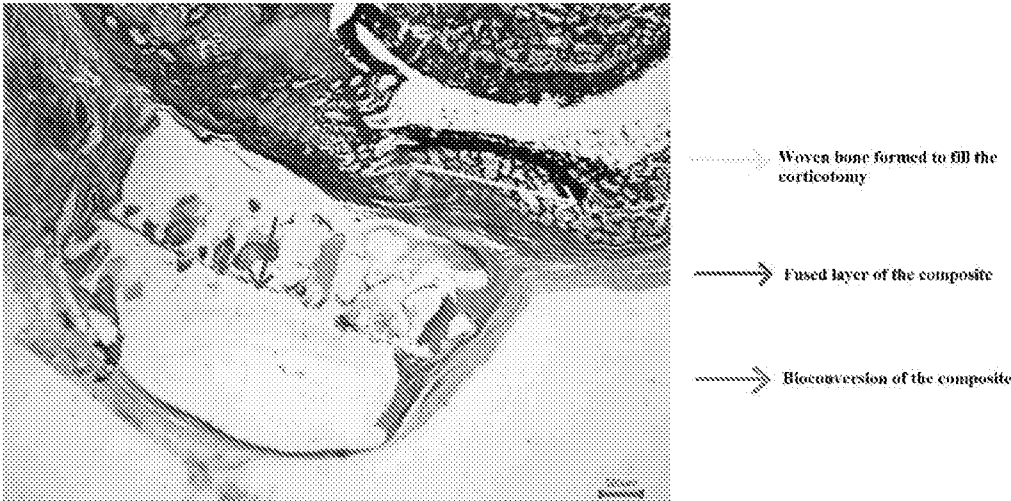


Figure 44a

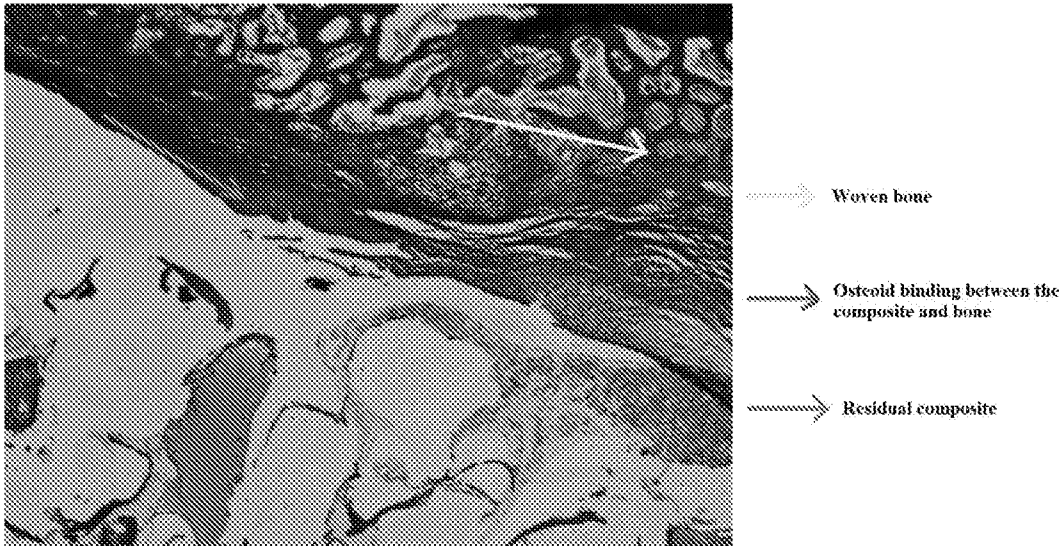


Figure 44b

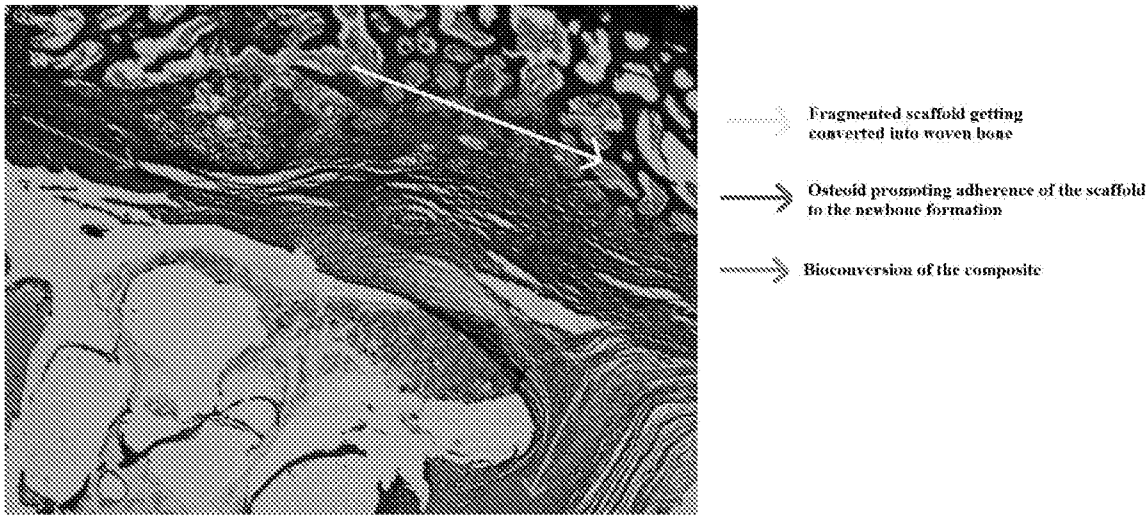


Figure 44c

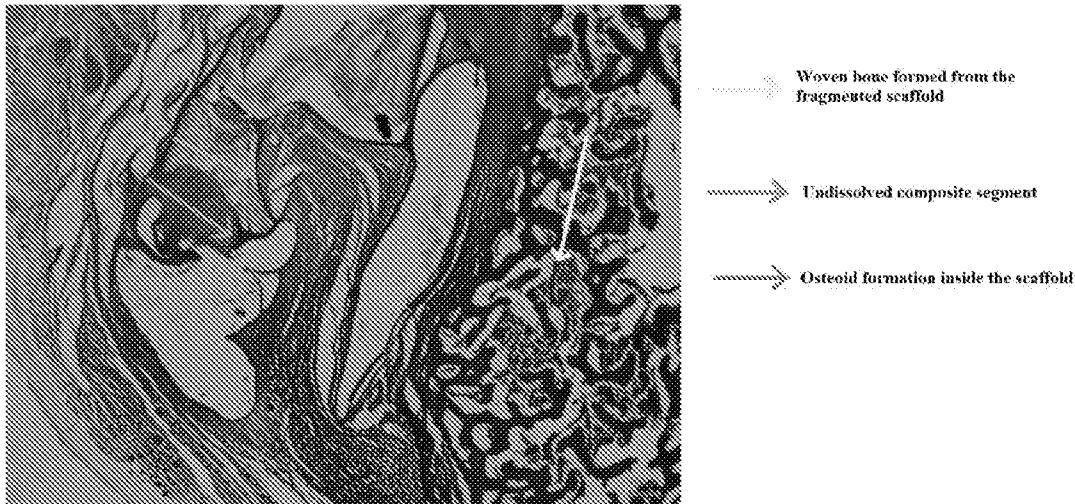


Figure 44d

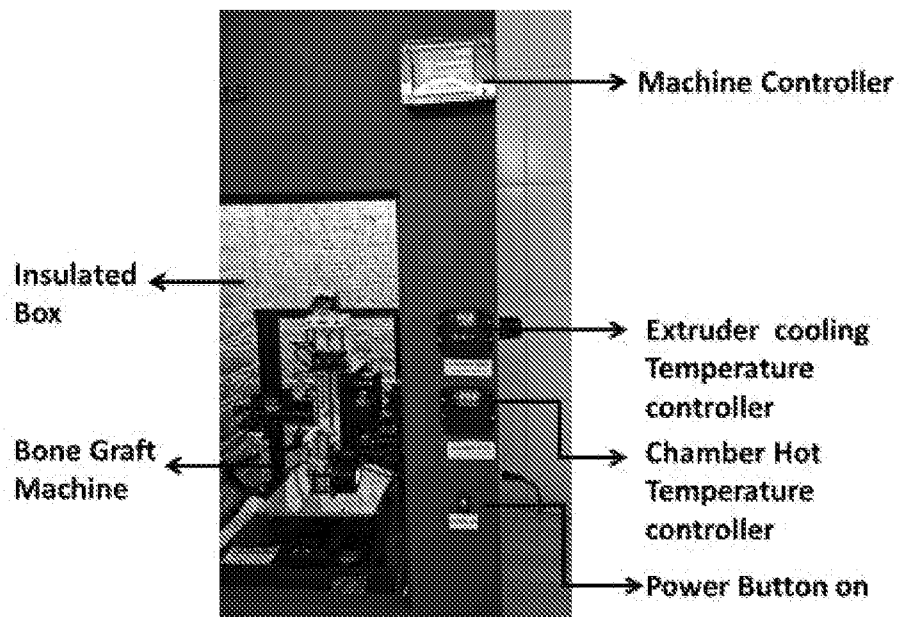


Figure 45 (a)

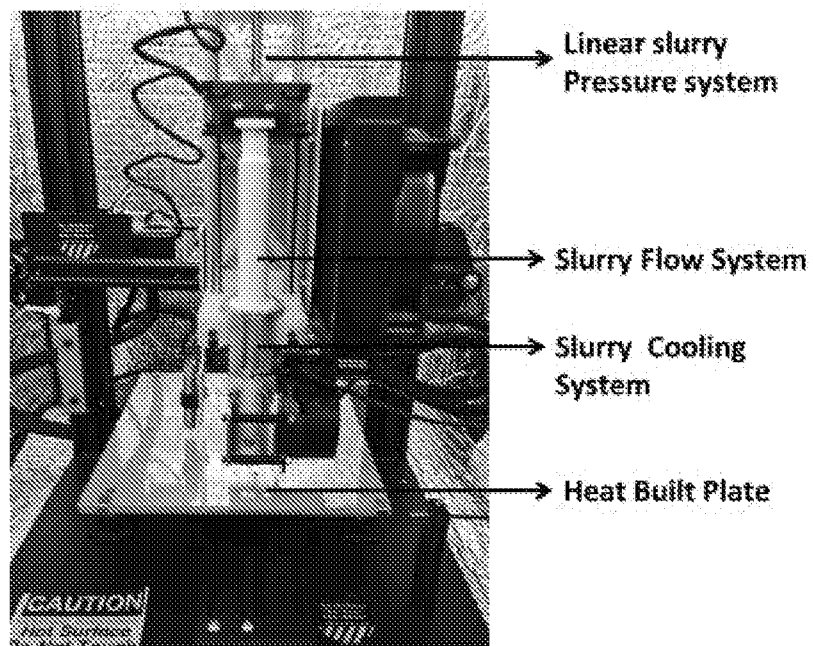


Figure 45(b)

Printed Output

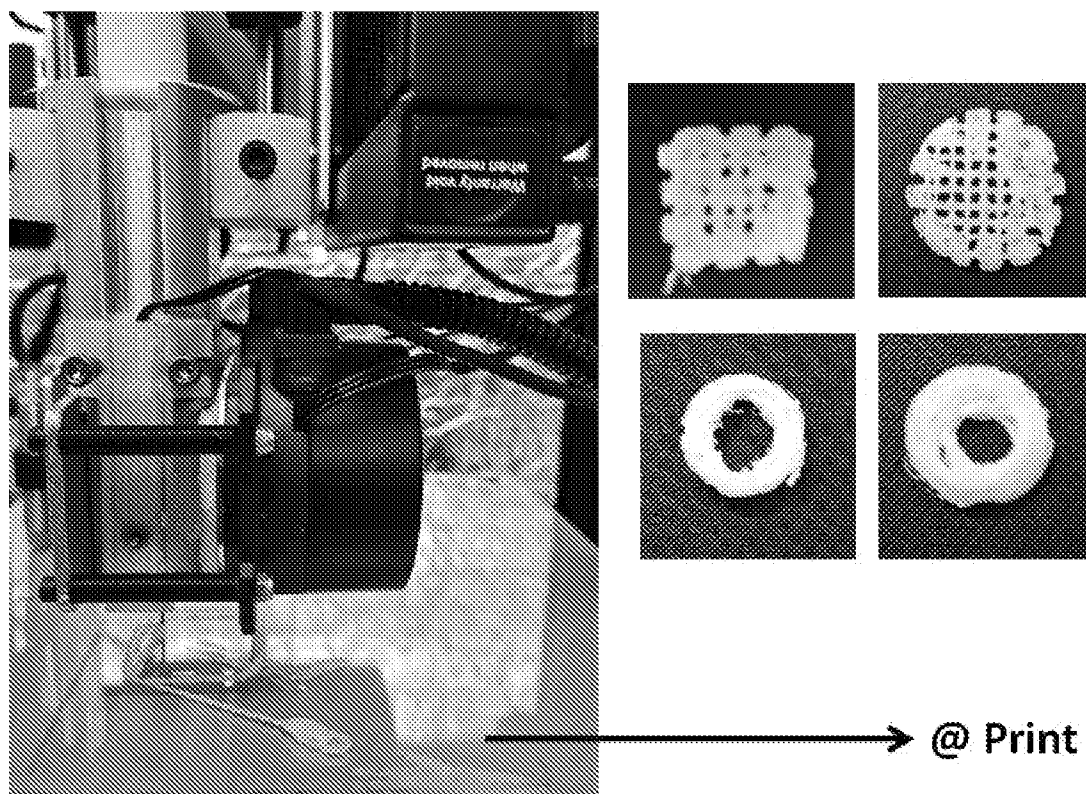


Figure 45(c)