

BION Oral

Novel Nanofibre Integrated SiN Scaffolds for Skeletal Implant Applications

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Nowadays, increase in number of orthopedic surgery accelerates global interest in the world orthopedic industry. Apart from the increased number of the surgery, the rapid recovery becomes very important following the initial operations. One of the common problem for the patients is the biocompatibility between the implant and tissue [1-3]. In this study, we aimed to improve attachment of the implant to the tissue in addition to provide high biocompatibility. After preparing a scaffold by using SiN subsequently we have coated with fine gelatine nanofibers. SiN is one of the most commonly used bioactive ceramic class, and also its biocompatibility is good enough.

20 ppi porous and non-porous SiN by using replica method has been obtained as model implants in order to compare their biocompatibility. Afterwards, these scaffolds were subjected to coat with gelatine nanofibers by 10 wt.% polymer solutions using a traditional electrospinning set-up.

As indicated by the SEM images, porous and non-porous SiN ceramic surfaces were successfully coated with gelatine nanofibers. The average fiber diameter on porous structure was determined 234 ± 36 and 229 ± 52 nm after 5 and 1 min coating time, respectively. Moreover, the average fiber diameter on non-porous SiN implant during 25 ± 5 sec was about 128 ± 20 nm.

In conclusion, the both porous and non-porous SiN scaffold were successfully coated with fine gelatine nanofibers with having homogeneous distribution. Our study now is continuing to determine in vitro enhancement of cellular behaviours and responses to see effect of nanofibers coating for their future scientific and practical value. It is believed that this versatile and robust composite implant will increase the level of biocompatibility and shorten the healing period after it is placed in to the body.

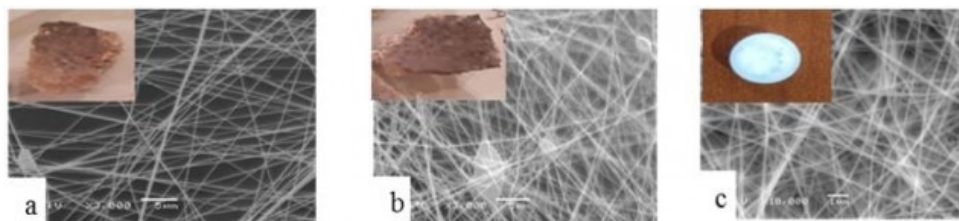


Figure 1. Nanofiber integrated SiN scaffolds for a) 5 min, b) 1 min, and c) 25±5 sec nanofiber coating. Inlets show the photography image of the material.

References

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