

Nanocolumnar films: sustainable manufacturing and applications in biomedicine

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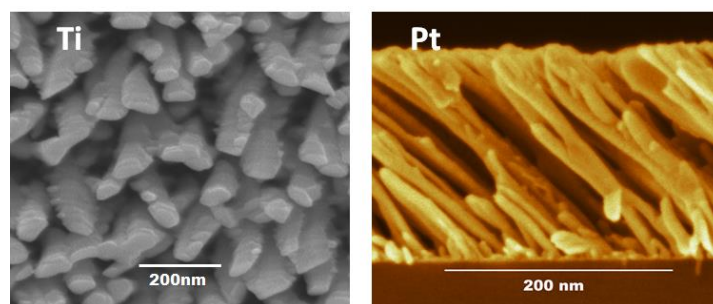
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Nanocolumnar films (NCFs) can be manufactured by glancing angle deposition with magnetron sputtering. This technique is environmentally friendly: it is carried out at RT in a single step (moderate energy consumption) and does not involve chemical products (no recycling issues). Depending on several parameters (namely the gas pressure, the electromagnetic power, the angle of inclination of the substrate and its possible rotation), the nanocolumnar structure can be controlled [1]. Moreover, this method can be scaled up to large surfaces, representing a valid approach for the industrial production of nanostructured films [2]. In particular, concerning biomedicine, NCFs made of Ti, Au and Pt have been fabricated and successfully employed in several applications. Ti NCFs can be used as antibacterial coatings for orthopedic implants [2,3]. Pt NCFs show improved properties as bioelectrodes for electric stimulation [4]. Finally, Au NCFs are excellent substrates for the identification of biomolecules in surface enhanced Raman spectroscopy, SERS [5].

Representative Figure:



Top view (left) and cross-section (right) SEM images of Ti and Pt NCFs, respectively.

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References

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