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# Abstract

In this thesis, magnetron sputtering is used to sputter thin films at a chemical composition that is intermediate to those of pure amorphous and crystalline thin films. For some metallic alloys, especially Zr-X alloys (X = Cr, V, Mo, W) that will be studied in this work, this results in a competitive growth between the amorphous and crystalline phases. The crystalline regions have a peculiar geometry that allows tailoring the surface morphology of the film and thus its surface‑related properties. We show that the deposition conditions (deposition pressure, deposition rate) have a significant impact on the films morphology. In particular, the deposition rate affects the nucleation and growth kinetics inside the crystalline regions, and varying the deposition pressure allows synthesizing films with novel microstructures. We then show that when coated with a thin copper layer, thin films deposited at a high pressure show a great potential as antibacterial surfaces, being more bactericidal than metallic copper, against Gram-negative bacteria as well as against Gram-positive bacteria. Finally, we focus on the close link that exists between the internal stress during film growth and the microstructure of these thin films, which allows us to gain precious insights on crystallization in these thin films.