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Deep oscillation versus direct current magnetron sputtering of AlN thin films for acoustic biosensors

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The potential to produce adequate Al/AlN films to be used in acoustic biosensors via deep oscillation magnetron sputtering (DOMS) and direct current magnetron sputtering (d.c. MS) was compared. The films were deposited on 304L stainless steel substrates and extensively characterized by scanning electron microscopy + energy dispersive microanalysis, glancing angle x-ray diffraction, and optical profilometry. The results indicate that both methods are capable of producing the required AlN hexagonal crystal structure and (002) orientation, however, the higher ionization fraction and adatom mobility provided by DOMS, seemed to provide better microstructural features. Preliminary biofunctionalization experiments suggest that these differences in film morphology may affect the attachment of the biomarker of interest.

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