Deposition of AlN films for acoustic biosensors by deep oscillation magnetron sputtering: effect of bias voltage

Al/AlN/Al thin films were obtained via deep oscillation magnetron sputtering (DOMS), the effect of the substrate voltage on the AlN structure was studied using Glancing Angle X-Ray Diffraction (GAXRD).

Sample preparation

There is no mention of any special preparation to perform GAXRD

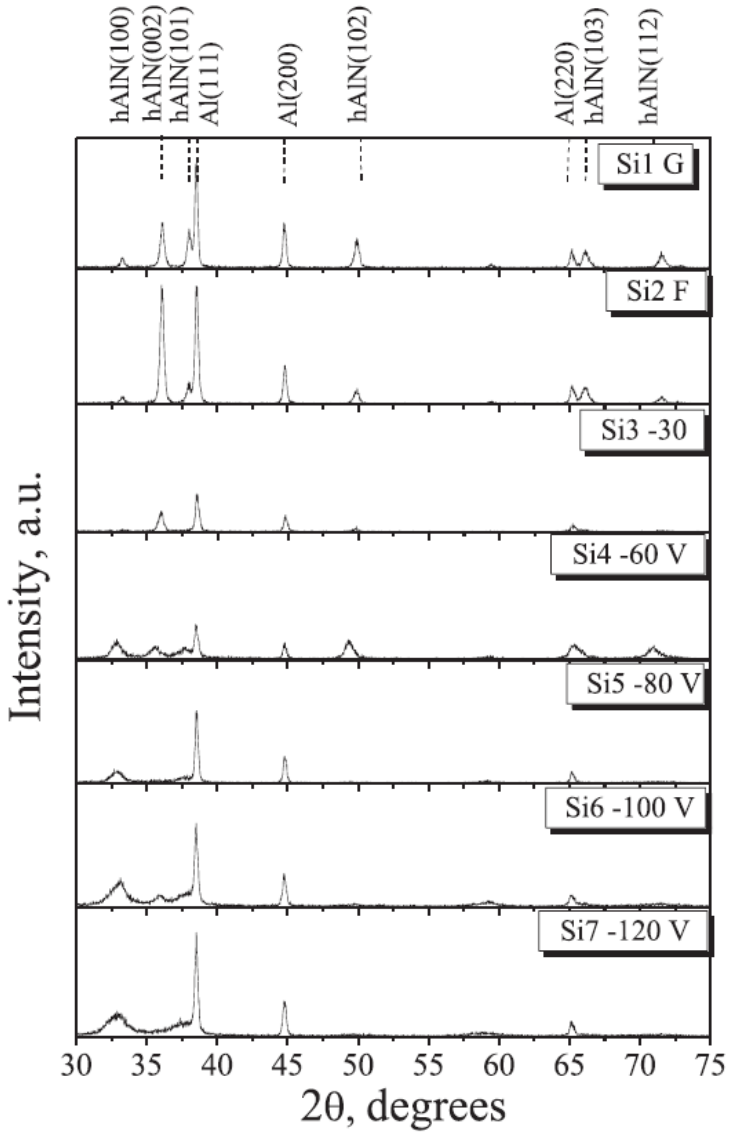
Data acquisition conditions

The GAXRD was performed at an incidence angle of 0.5° at 40kV and 25 mA with a Cu-kα radiation source and a 1s time step.

The samples were measured between 30 and 75° in 2θ

Results

Structure of the thin films changed depending on the applied voltage of the substrate, only the wurtzite structure of the AlN was found, without evidence of presence of the cubic structure.
The amount of (002) orientation, which is relevant for its use in biosensors changes depending on the voltage, obtaining its best value when there is not voltage applied at the substrate and when is electrically floated.



GAXRD patterns from the surface of the Al/AlN/Al films for the seven bias voltage values used.

Melo-Máximo, L., Lin, J., Murillo, A. E., Salas, O., Oliva-Ramírez, J., Oseguera, J., … Melo-Máximo, D. (2018). Deposition of AlN films for acoustic biosensors by deep oscillation magnetron sputtering: effect of bias voltage. Thin Solid Films, 664(March), 83–89. https://doi.org/10.1016/j.tsf.2018.08.022