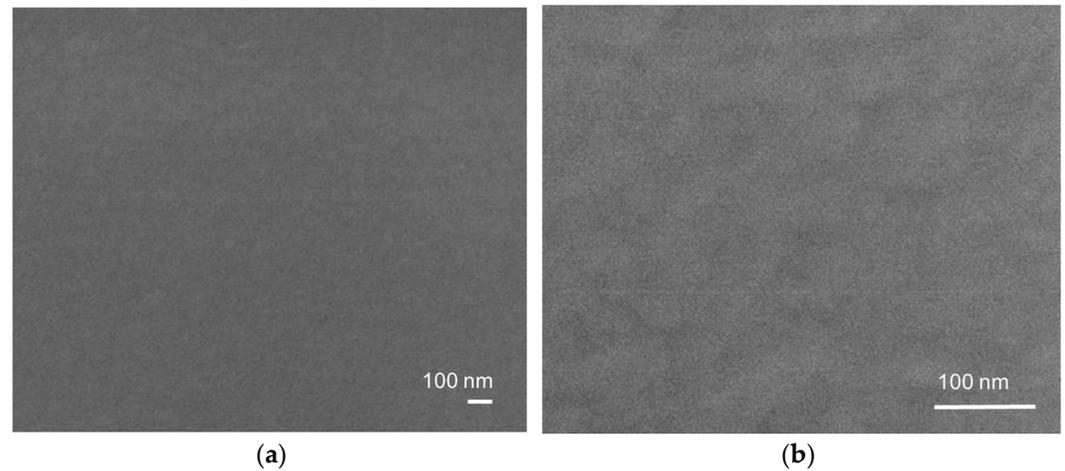


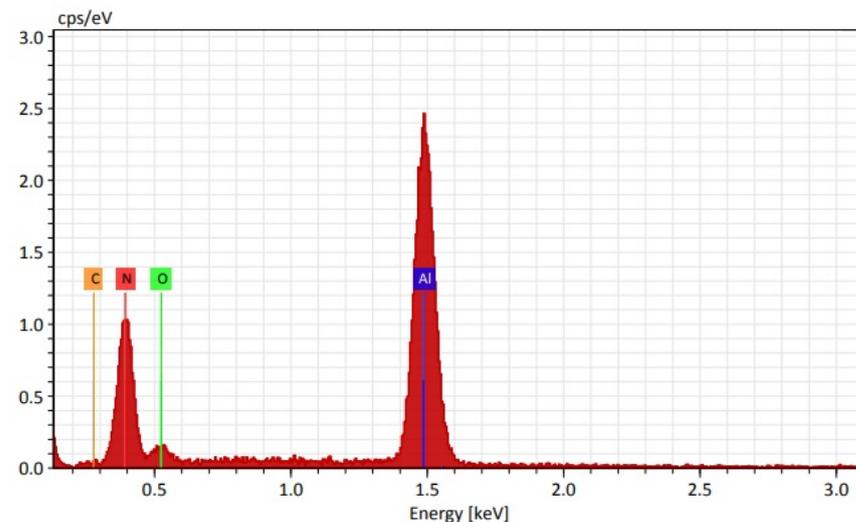
# Supplementary Materials: Chemical Composition, Structure, and Physical Properties of AlN Films Produced via Pulsed DC Reactive Magnetron Sputtering

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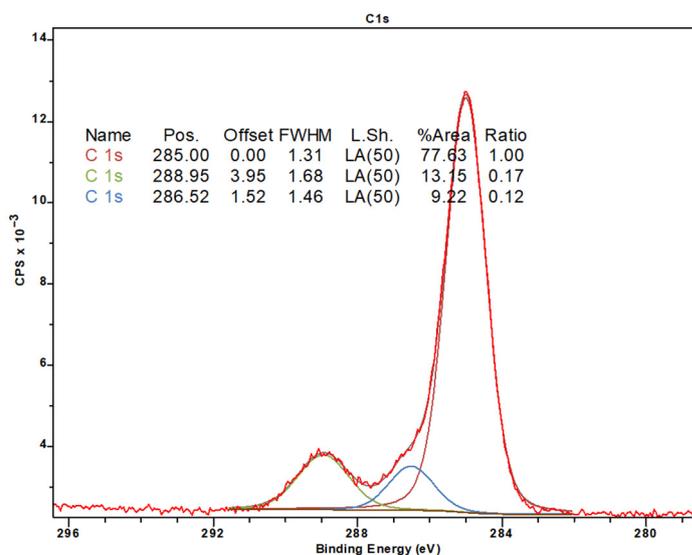
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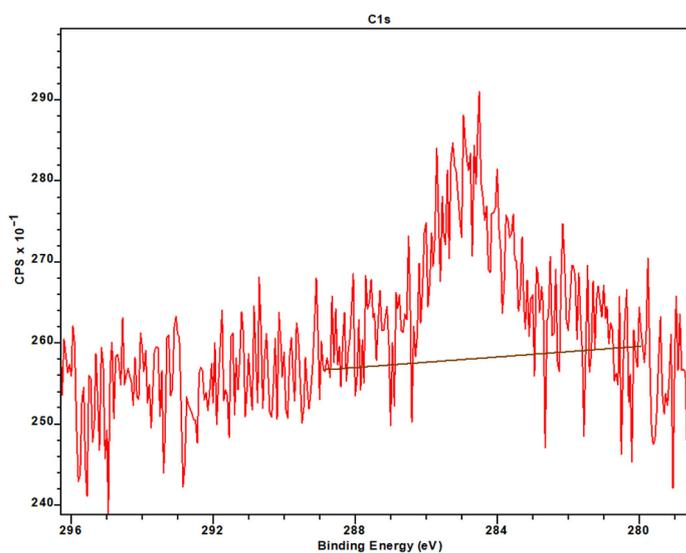
**Figure S1.** Typical SEM images of AlN/Si(111) samples at 50k (a) and 200k (b) magnification.



**Figure S2.** A typical EDS spectrum of AlN film.



(a)



(b)

**Figure S3.** C1s XPS spectra AlN films measured before ion etching (a) and after 11 min etching (b).

#### Comment on Figure S3.

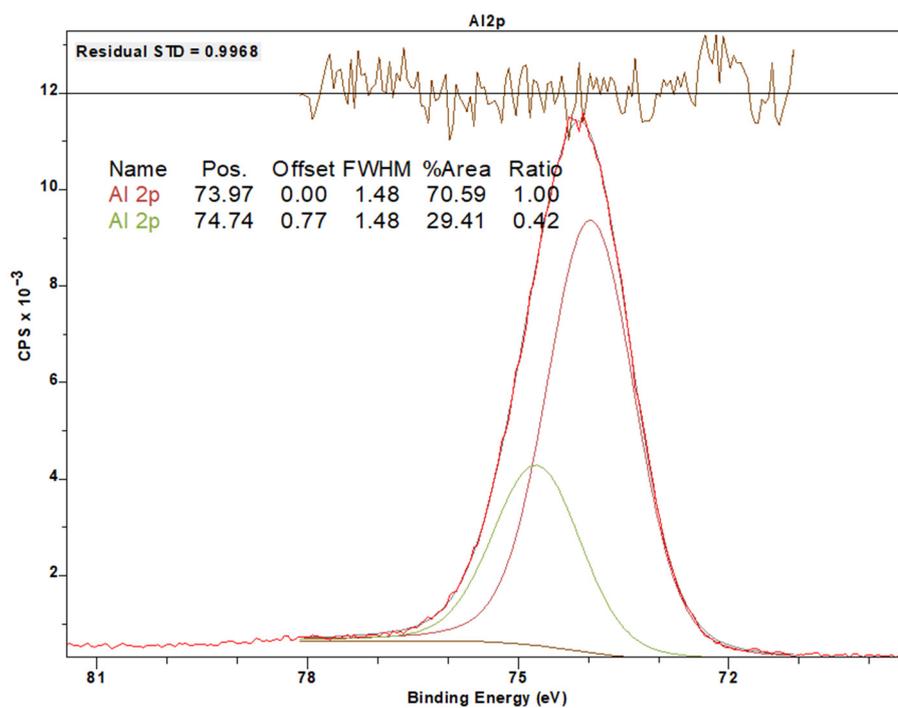
Figure S3 demonstrates comparison of the sample XPS spectra before etching and after etching. Carbon was clearly distinguishable before the etching (Fig. S3(a)) due to specific XPS energy peaks [<http://dx.doi.org/10.1016/j.apsusc.2015.06.079>]:

285 eV peak for C-C bond, i.e. carbon contamination;

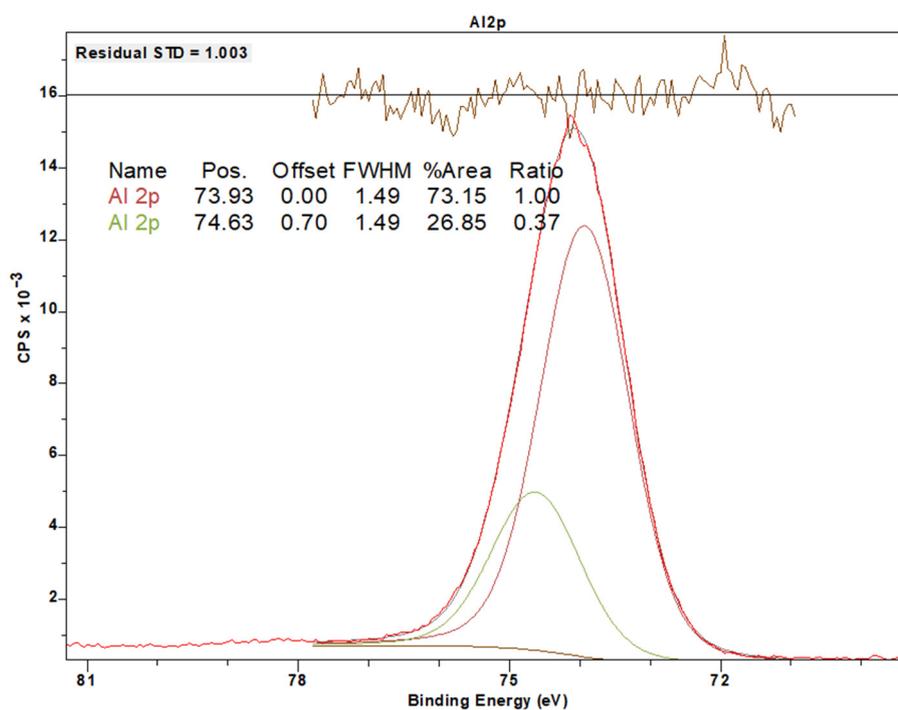
286.5 eV peak for C-O(H) hydroxyl bond;

289 eV peak is related to O=C-O carboxyl bond.

However, after etching (Fig. S3(b)) the peaks of carbon were not observable. Therefore, it is possible to conclude that carbon appeared deposited only in the surface of AlN films, but not in their bulk.



(a)



(b)

**Figure S4.** Al<sub>2</sub>p XPS spectra of AlN films measured before ion etching (a) and after 11 min etching (b).

#### Comment on Figure S4

Peak 73.9 eV is attributed as Al-N bond, peak 74.6-74.7 eV is attributed as Al-O bond [Sharma, N.; Ilango, S.; Dash, S.; Tyagi, A. K. X-ray photoelectron spectroscopy studies on AlN thin films grown by ion beam sputtering in reactive assistance of N<sup>+</sup>/N<sub>2</sub><sup>+</sup> ions: Substrate temperature induced compositional variations. *Thin Solid Films*. 2017, 636, 626-633].