

Standard specifications of sapphire-based AlN templates

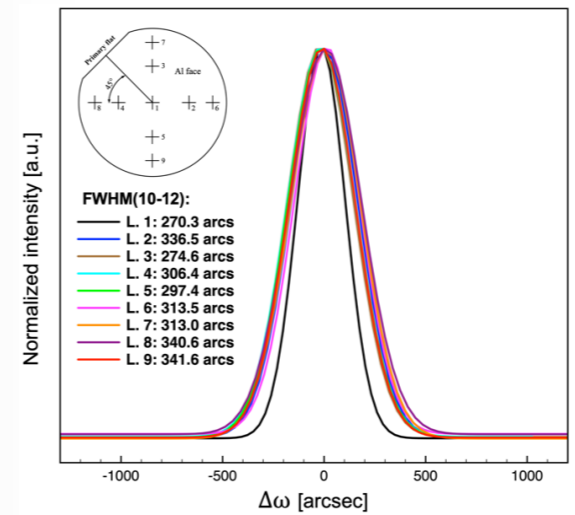
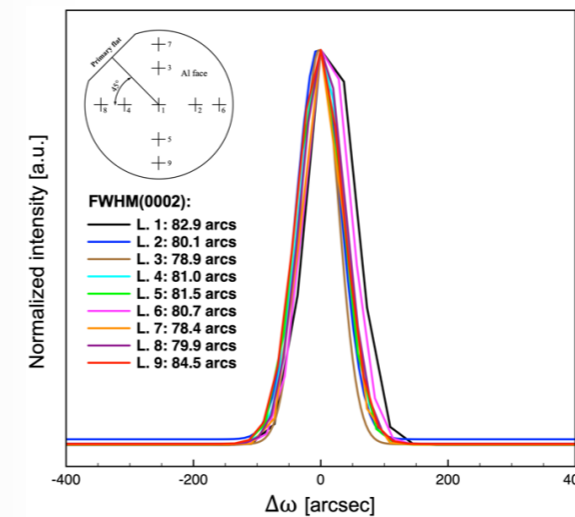
At present, Ultratrend Technologies Co.,Ltd. (UTC) can provide standardized and tailored high-quality AlN templates with diameter arranged from 2/4/6 inches and AlN thin film thickness arranged from 50-3000 nm, which are ideally suited as substrate for UVC-LED, UV detectors and high-power/high-frequency electronic devices (such as 5G SAW/BAW devices) etc..

Characteristic	Specification		
Model	UTI-AIN-050A	UTI-AIN-100A	UTI-AIN-150A
Substrate	C-plane of sapphire		
AlN structure	Wurtzite		
Diameter (inch)	2	4	6
Substrate thickness (μm)	430 ± 15	650 ± 20	1300 ± 20
AlN Film thickness (nm)	200/400/600/800/1000 (Technical specs may vary with AlN film thickness, hereby taking 200nm as an example)		
Orientation	C-axis [0001] +/- 0.2°		
Usable Area	≥95%		
Cracks	None		
Back surface finish (μm)	RMS<1.2		
FWHM-HRXXRD@(0002) (arcsec)	<100		
FWHM-HRXXRD@(10-12) (arcsec)	<350		
Surface Roughness@[5×5μm] (nm)	Ra≤2		
TTV (μm)	≤10	≤20	≤20
Bow (μm)	≤20	≤40	≤60
Warp (μm)	≤20	≤40	≤60
Packaging	Single/Multi wafer cups		

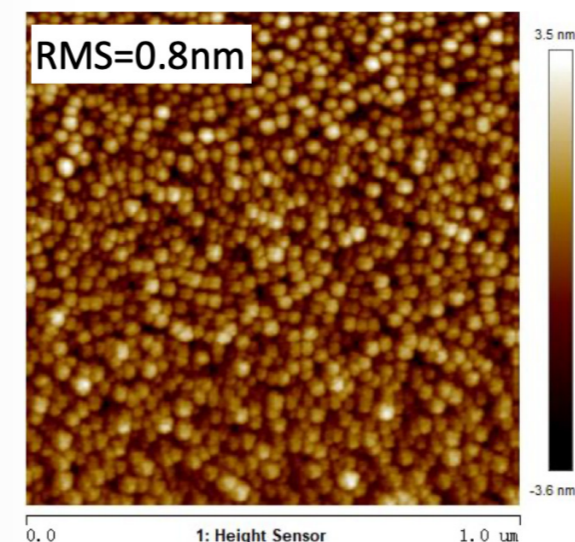
Note: These characterization results may vary slightly depending on the equipments and/or software employed



Characterization results of sapphire-based AlN templates



FWHM values of (0002) and (10-12) by HRXRD



AFM image of AlN templates



Applications of sapphire-based AlN templates

Silicon-based semiconductor technology has reached its limits and could not satisfy the requirements of future electronic devices. As a typical kind of 3rd/4th-generation semiconductor material, aluminum nitride (AlN) has superior physical and chemical properties such as wide bandgap, high thermal conductivity, high breakdown field, high electronic mobility and corrosion/radiation resistance, and is a perfect substrate for optoelectronic devices, radio frequency (RF) devices, high-power/high-frequency electronic devices, etc.. Particularly, AlN substrate is the best candidate for UV-LED, UV detectors, UV lasers, 5G high-power/high-frequency RF devices and 5G SAW/BAW devices, which could widely be used in environmental protection, electronics, wireless communications, printing, biology, healthcare, military and other fields, such as UV purification/sterilization, UV curing, photocatalysis, counterfeit detection, high-density storage, medical phototherapy, drug discovery, wireless and secure communication, aerospace/deep-space detection and other fields.

Ultratrend Technologies Co.,Ltd. (UTC) has developed a series of proprietary processes and technologies to fabricate high-quality AlN templates. At present, UTI is the only company worldwide who can produce 2/4/6 inch AlN templates in large-scale industrial production capability with capacity of 300,000 pieces in 2020 to meet explosive market demand from UVC-LED, 5G wireless communication, UV detectors and sensors etc..

