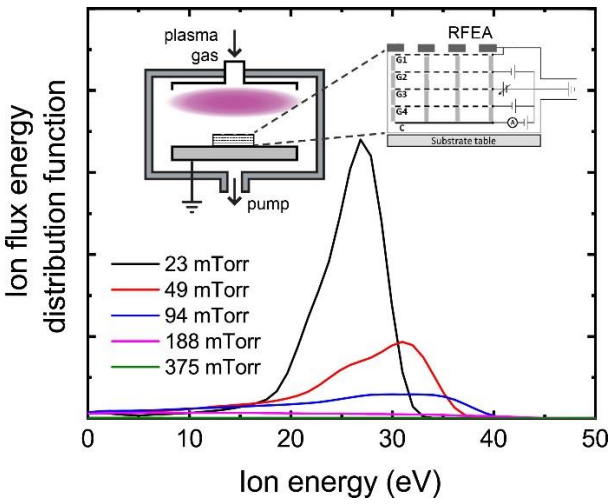
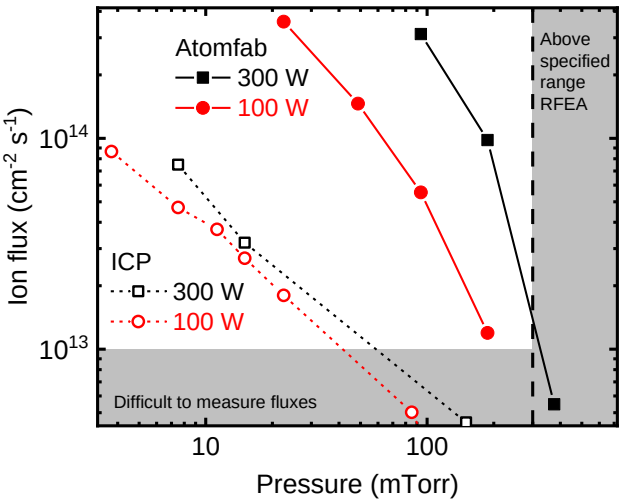
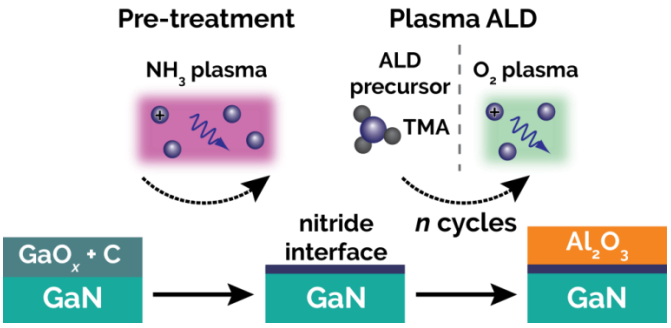


Effect of chamber pressure on ion flux energy distribution function in O_2/Ar plasma at 200 W in Atomfab. Energies are generally below 40 eV and fluxes strongly decrease with increasing pressure. Inset shows schematic of retarding field energy analyzer (RFEA) setup in test system.



Comparison of ion flux as a function of pressure between ICP remote plasma ALD, and Atomfab for O_2 plasmas. Note that the results from ICP are obtained using an ion probe and not using an RFEA. The results are plotted on a log-log scale for easy comparison. Low ion fluxes are also achievable with the Atomfab but generally occur at higher pressures than in an ICP system.



Process of NH_3 plasma pre-treatment and Al_2O_3 plasma ALD. The plasma pre-treatment is expected to remove carbon and oxygen from the surface but can also cause nitridation of the GaN-dielectric interface. To end up with a high-performance device the ion energy and plasma density need to be controlled.

Pre-treatment	FGA	Hysteresis (mV)	Dispersion (mV)
No	No	425	425
Yes	No	150	400
No	Yes	125	150
Yes	Yes	100	125

The resulting effect of plasma pre-treatment and a standard forming gas anneal on hysteresis and dispersion of a GaN test device using a plasma power of 100 W, which shows the benefit of the pre-treatment on top of the anneal and the relatively low values.