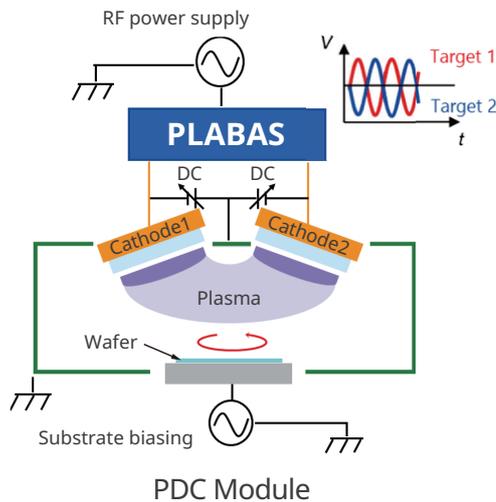


# Dielectric Film Sputtering

**PLABAS<sup>1)</sup> Dual Cathode (PDC) module** ensures a highly stable dielectric sputtering process throughout the entire target life. 1) Plasma Balanced System



## <Features>

- Stable deposition performance even if the insulating film continues to accumulate on the grounded shield.
- Substrate biasing function enables the improvement of film quality.
- Co-sputtering
  - Precise and flexible composition control
  - Low running costs by using affordable metal targets.



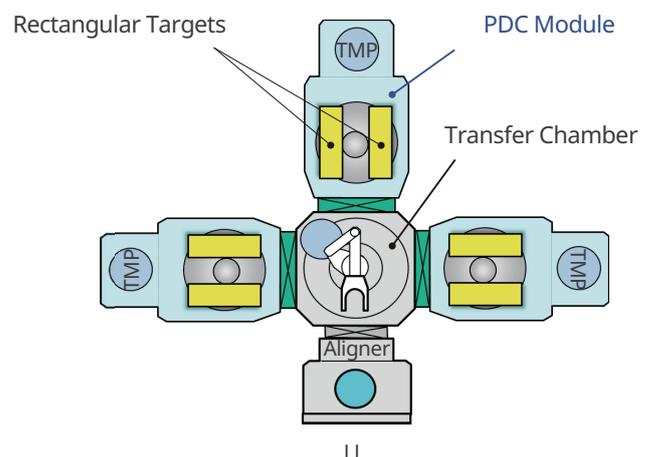
PLABAS Dual Cathode (PDC)

## <Applications>

- SiO<sub>2</sub> film as a temperature compensation layer for RF filters (TC-SAW).
- Piezoelectric films for MEMS devices such as PMUTs and microphones. (AlN, AlScN, KNN<sup>2)</sup>, etc.)

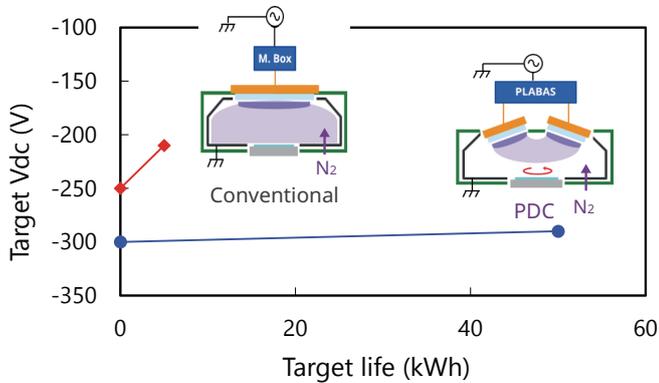
2) (K, Na)NbO<sub>3</sub>, lead-free piezoelectric material

## EC7430 Dielectric Film Sputtering System



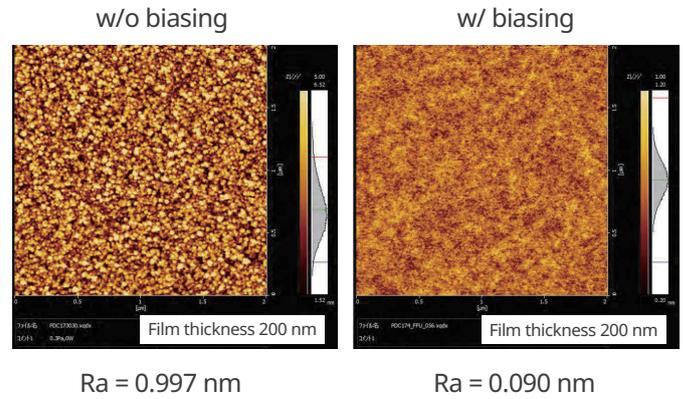
# Dielectric Film Sputtering

## Advantages of PDC Module



Long-term stability in the AlN deposition process

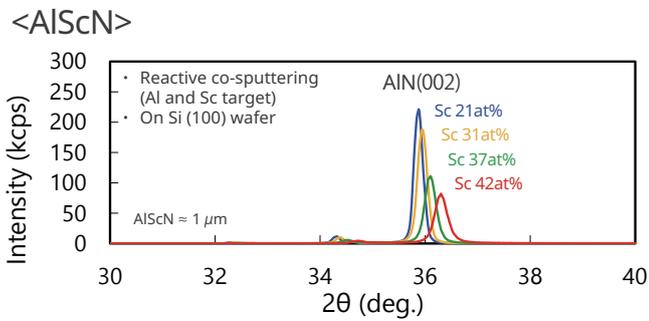
Even if the grounded shield is gradually covered with an insulating film, the plasma remains stable throughout the entire target life.



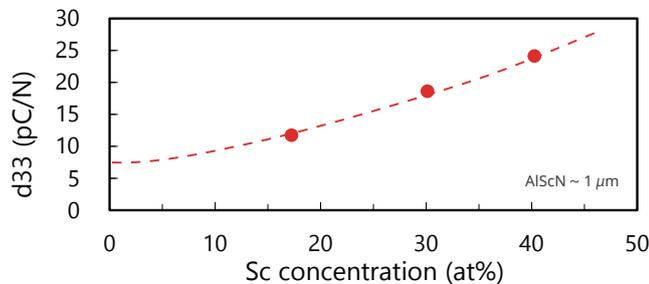
AFM Images of SiO<sub>2</sub> film

Substrate biasing during deposition significantly improves surface smoothness. (~ 0.1 nm)

## Application to Piezoelectric Films



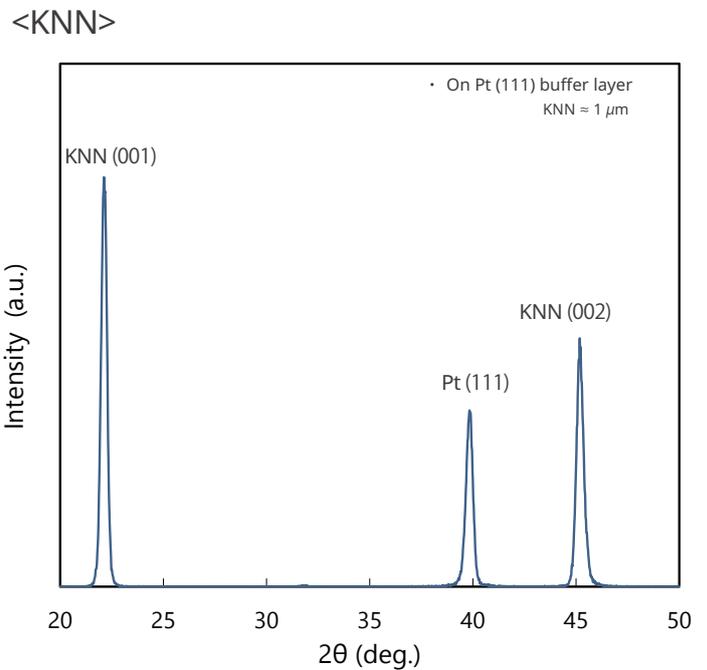
Out-of-plane XRD of AlScN



Piezoelectric constant d<sub>33</sub>

Co-sputtering allows for flexible control of Sc concentration.

High piezoelectric performance is achieved with a high Sc concentration.



Out-of-plane XRD of KNN

(001) oriented KNN can be deposited even on a Pt (111) underlayer.