



Single Domain LiNbO₃ Thin Films Integration via a Seed Layer Approach

A scalable, seed enabled process delivers single domain lithium niobate on standard substrates—including Si—cutting loss and simplifying RF and photonics integration.

Researchers at Purdue University have developed a new method for single domain lithium niobate (LiNbO₃) thin films integration via a seed layer approach. Currently, twin free single domain-like growth is achievable but requires conditions that are challenging to replicate. Purdue researchers introduce a single laser pulsation technique for growing LNO films with comprehensive microstructure. This process also eliminates traditional need for etching which can cause limitations in thin film materials. These films can be implemented in optics, acoustics, and electronics to reduce losses and optimize efficiency.

Technology Validation:

The growth conditions for the new LNO thin films developed by Purdue researchers have been optimized for ease of replication and integrated into a potential RF application showing promise for additional electro-acoustic applications.

Advantages:

- Single Approach
- Low-Cost
- Highly Efficient
- Optimizes and Retains LNO Material Properties

Applications:

- Optical Waveguides
- Surface Acoustic Wave (SAW) Devices
- Acoustic and Electro-Optic Modulators

Technology ID

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Category

Semiconductors/Fabrication &
Process Technologies
Materials Science &
Nanotechnology/Advanced
Functional Materials
Computing/Photonic & Optical
Computing Technologies

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-Second Harmonic Generators

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Publication:

"Technology Uses 'Single' Approach to Develop Electronics, Acoustics"

Purdue University, Research Foundation News

<https://www.purdue.edu/newsroom/releases/2021/Q1/technology-uses-single-approach-to-develop-electronics,-acoustics.html>

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