



# TiW alloy adhesion layer for integration of anodic aluminum oxide on substrates

A method for developing an integrated via structure for improved performance in CMOS applications at millimeter- and submillimeter-wave frequencies

Technology ID

2021-171

## Category

All Technologies

Engineering & Physical

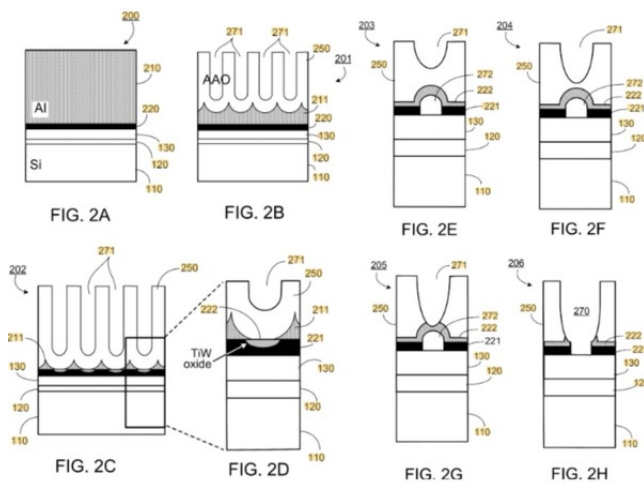
Sciences/Nanotechnology

Engineering & Physical

Sciences/Processes

Engineering & Physical

Sciences/Semiconductor



## Learn more



IP Status: US Patent Issued; Patent No. 12,100,879

## Applications

- Submillimeter-Wave Communications
- Millimeter-Wave Communications
- Internet of Things Devices
- 3D integrated circuits

## Technology Overview

In IC circuits and systems, vias play a significant role in providing high-density interconnections between active devices, however, as the communication frequency band expands progressively into millimeter and even submillimeter-wave frequencies, higher skin depth loss and parasitic inductance for vias become prohibitive. Researchers at the University of Minnesota have developed a method for using a TiW adhesion layer to integrate anodic aluminum oxide (AAO) on substrates, removing the commonly formed barrier layer for electrical contact, and widening the pores of the AAO for various nanomaterials and devices. Using this structure, bundles of nanowires are fabricated in an ultrathin device, resulting in a decrease in total power loss at high frequencies with improved integration.

## Phase of Development

TRL: 4

Working prototypes have been developed.

## Desired Partnerships

This technology is now available for:

- License
- Sponsored research
- Co-development

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## Press Releases

[University of Minnesota College of Science & Engineering](#) January 29, 2021

## Researchers

- [Bethanie Stadler](#) Professor, Electrical and Computer Engineering
- [Rhonda Franklin](#) Professor, Department of Electrical and Computer Engineering

## References

1. Yali Zhang; Joseph Um; Bethanie Stadler; Rashaunda Henderson; Rhonda Franklin(2021) , <https://ieeexplore.ieee.org/document/9369363>, IEEE Microwave and Wireless Components Letters, 31, 693 - 696