

Fabrication and delamination of multilayer dielectric foil



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The invention is a **method for** fabrication and large-scale delamination of dielectric foil consisting of many layers.

Researchers at ANU have developed a process that allows them to mechanically exfoliate all dielectric multilayer structures from III-V semiconductor wafer substrates on a cm-scale. This results in the dry delamination in form of a flexible foil and removes the need for harsh acids such as HCl or HF.

This technique also has significant potential for design and scalable fabrication of functional optical heterostructures where any residual acid/solvent contamination would otherwise result in unacceptable losses of functionality.

Potential benefits

- > **Design Variety:** Depending on the layer sequence and the layer thicknesses, a variety of dielectric coatings in the form of foil can be fabricated using this process.
- > **Functionality:** Flexible foil can be used as a functional building block for these devices and mechanically placed onto any target substrate.
- > **Safe Production:** No exposure to aggressive physical and/or chemical
- > **Improved Quality:** Other methods can lead to contamination of both the substrates and the separated films.

Potential applications

- > Laser technologies (e.g., vertical-cavity surface-emitting laser)
- > Quantum technologies (e.g., Purcell enhanced single-photon emitters)
- > Information technologies (e.g., Dissipationless transistors)
- > Space and Aviation technologies (e.g., reducing weight of components by removing substrate from the functional elements)
- > Medical technologies (e.g., downsizing of diagnostic tools to access smaller vessels)

Opportunity

We are seeking industry feedback on applications and opportunities of interest.

IP status

The IP is owned by The Australian National University.

Key research team

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