# Imagine TF TECH BRIEF

# Nano and Micro Filtration Technology

***Imagine TF has invented, developed, and is licensing technology for use in microfluidic devices that can produce precise nanometer or micron-scale pores.***

## Enabling the Future

Solve your challenging fluidic issues or enhance the performance of current systems with layered fluidic technology

## Nano Precision

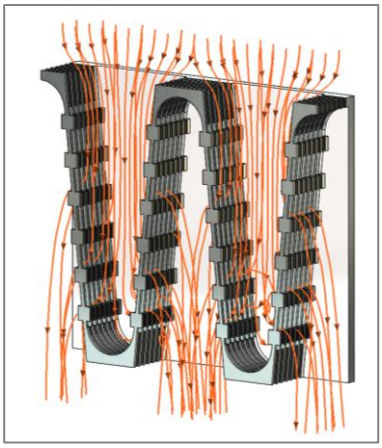
Precise fluidic structures fabricated with nanometer accuracy

## Simulation

Patterned architecture and geometric structures enable CFD and multiphysic simulations

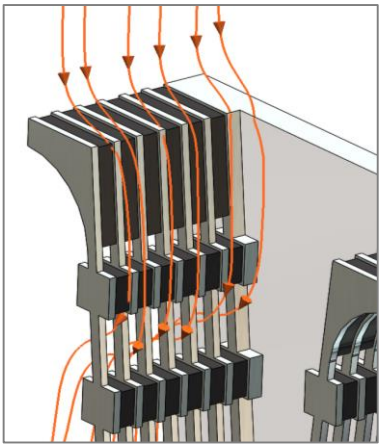
## Proven, Low-Cost Production Techniques

Semiconductor or printing manufacturing technology for precision filters and microfluidic devices produced at a low cost



### Flow

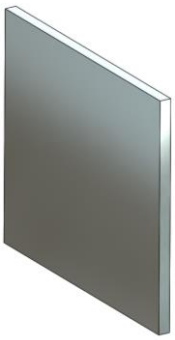
Fluids flow along the surface of a substrate and are filtered with pores in the W-shaped walls.



### Pores

Pores are formed in the walls with an innovative process, and can be nanometer in scale and in accuracy.

*Layered filter pores allow for the creation of precise pores and structures with simple manufacturing methods.*



### 1. Substrate

A wide range of materials can be used as a substrate.

### 2. Structures

Deposit or laminate alternating types of materials.

### 3. Etch

Etch away the main fluidic channels.

### 4. Open pores

Partially etch away one of the materials to create pores.

*With conventional semiconductor processing equipment, complex fluidic pores and structures can be created with only a few steps for much less than a dollar per square inch.*

Imagine TF

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# Imagine TF TECH BRIEF



## "Lab on a Chip"

Nanometer-scale elements can be inserted in or created within a larger fluidic system.

## High Flow Applications

Chips can be arrayed for applications requiring high flow rates.

## Materials, Coatings, & Surface Functionalization

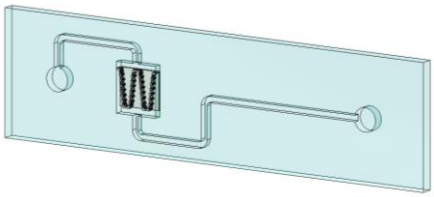
Almost all conventional methods and materials can be applied to the devices with no need for new processes.

## Proven Technology

Process development and fabrication of a number of devices has been demonstrated, with up to 60 layers with thicknesses between 10nm and 300nm.

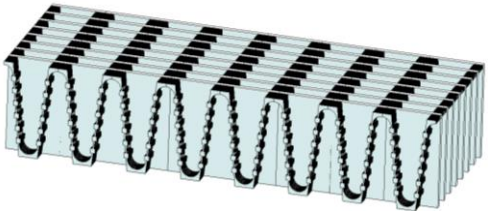
# Applications, Materials & Examples

*Devices have been fabricated for low and high flow rates*



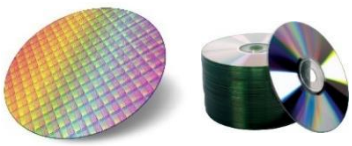
### Low Flow Rate Applications

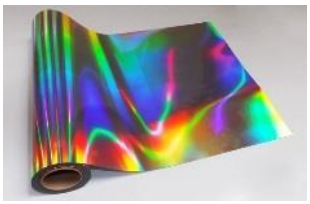
A small chip can be used in low flow applications, assembled into a more complex fluidic system.



### High Flow Rate Applications

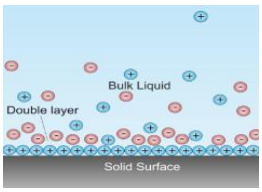
For high flow applications, chips can be larger in size and arrayed on top of one another

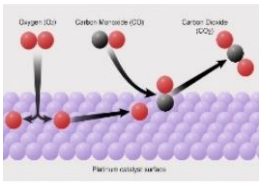


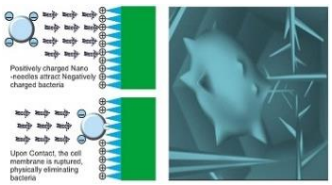


### Materials

Layered filter pores can be fabricated with a wide range of materials. Semiconductor materials and processing equipment allow for accurate nanometer-scale pores.

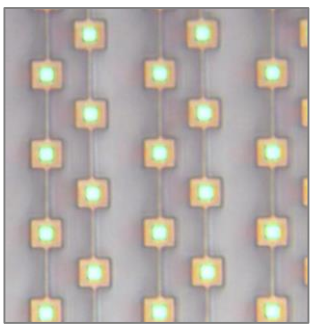




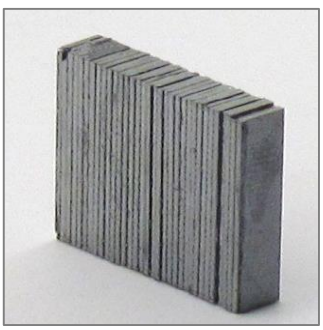

### Coatings and Functionalization

A wide range of coatings can be applied with conventional equipment to the surfaces of the filter to add functionality. Coatings can be conductive to add an external electric potential to the flow.



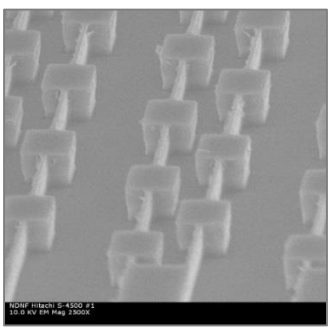
### SEM of 20nm pores

Top view of 20nm pores. Silicon substrate with SiN4 and a-Si



### An array of chips

An array of chips for a high flow application



### SEM of 80nm pores

Isometric view of 60 layers of 80nm pores

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