Imagine TF TECH BRIEF

Mixing Technology

Imagine TF has invented, developed, and is licensing technology for mixing liquids and or gases in small and large scale systems.

Enabling the Future

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

Precision Mixing

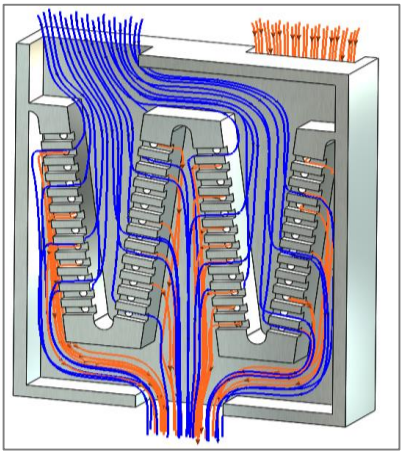
Precise, repeatable fluidic structures fabricated with nanometer accuracy.

Simulation

Patterned architecture and geometric structures enable CFD and multiphysic simulations.

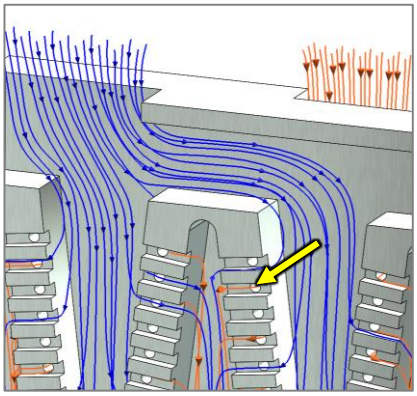
Proven, Low-Cost Production Techniques

Molding, stamping, machining or semiconductor manufacturing technology for precision mixing devices can be produced at a low cost.



Flow

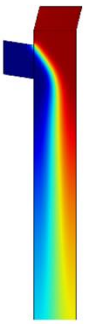
Fluids enter in the top and exit at the bottom. V shaped plenums supply large numbers of mixing slots at equal pressures.



Detail View

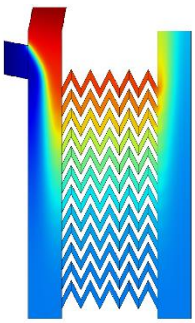
Fluids are delivered to the mixing slots from the sides and from a hole that is linked to a plenum on the backside of the device. Hundreds or thousands of mixings slots can be run in parallel.

Complete and controlled mixing for liquids, gases and combinations of liquid and gas. Mix continuously with the quality of a batch process. Atomize liquids in gasses. Create bubbles or droplets in liquids.



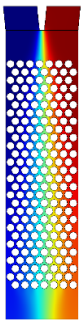
Conventional "T" mixing

Adequate for applications that don't required high degrees of mixing.



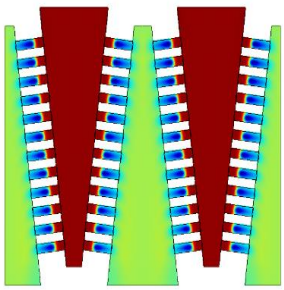
Zig Zag channels

Adding zig zag channels yields some improvement in mixing performance.



Mixing Posts

Commonly used in "lab on a chip". Poor mixing at high Reynolds numbers, very poor mixing at low numbers.



Imagine TF Mixing

Complete mixing with 48 "T" mixing areas running in parallel. Mixing ratio is not effected by flow rates or Reynolds number.

With conventional mixing technology it is often difficult to mix two fluids completely. Imagine TF 's technology solves the most challenging mixing problems.

Imagine TF
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Imagine TF TECH BRIEF

"Lab on a Chip"

Mixing 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, from 350nm to mm.

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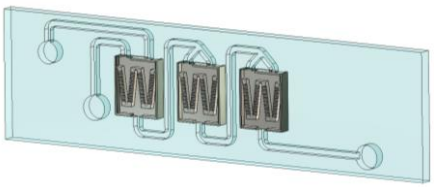
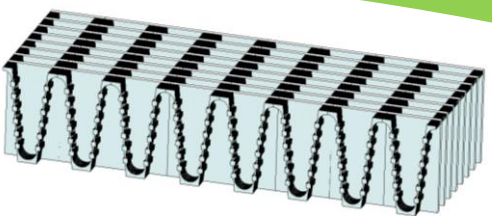
Applications, Materials & Examples

Devices have been fabricated for low and high flows



Low Flow Rate Applications

A small chip can be used in low flow applications and assembled into a more complex fluidic system. Small dead volume. With a 3x series and 48x parallel configuration the fluid is mixed over 110,000 times (48^3)

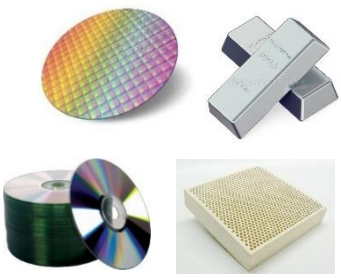


High Flow Rate Applications

For high flow applications, mixing devices can be larger in size and arrayed on top of one another. Only low pressure is required. No moving parts, seals or motor is required.

Chemical Reactions

Heat transfer in a chemical reaction can be accurately controlled. A catalyst can easily be added to the mixing surfaces to enhance or control a reaction.

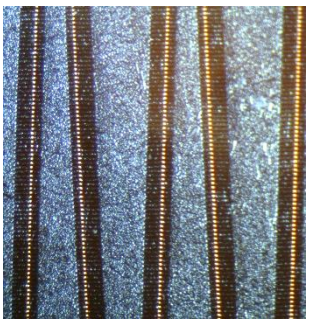


Materials

Mixing arrays can be fabricated with a wide range of materials including; plastics, metals, semiconductor materials and ceramics

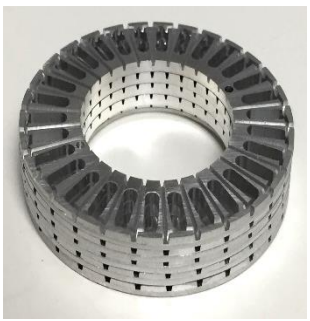
Manufacturing

Mixing arrays can be fabricated with semiconductor processing, CD/DVD, injection molding, roll to roll, stamping, and casting equipment.



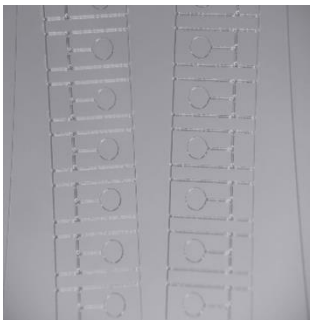
Mixing chip

30µm wide mixing channels with 12µm holes (illuminated from the backside).



An array of mixing disks

800µm wide mixing areas. A total of 160 areas are in this array. Fabricated with stainless steel.



Molded mixing panel

50µm wide mixing channels molded in polycarbonate with a CD/DVD molding machine.