

Single Wafer "Floating Process"

Horizontal single Wafer Process

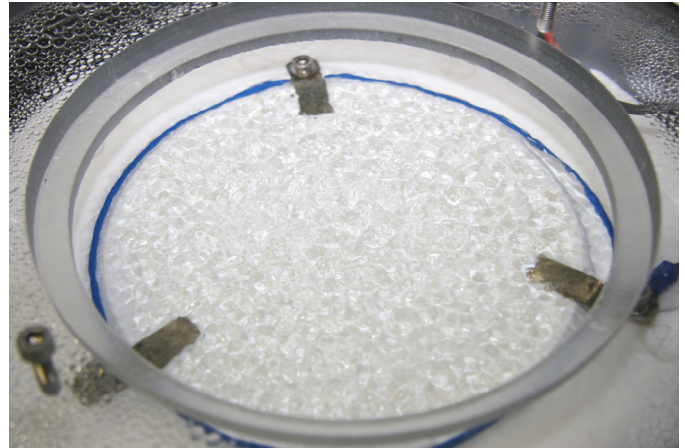
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SPM is proud to present its new prototype of single wafer processing.

The original idea that focused us on the problem was to find an innovative method to process single wafer-solar cell-substrate instead of the actual complicated and expensive mechanism.

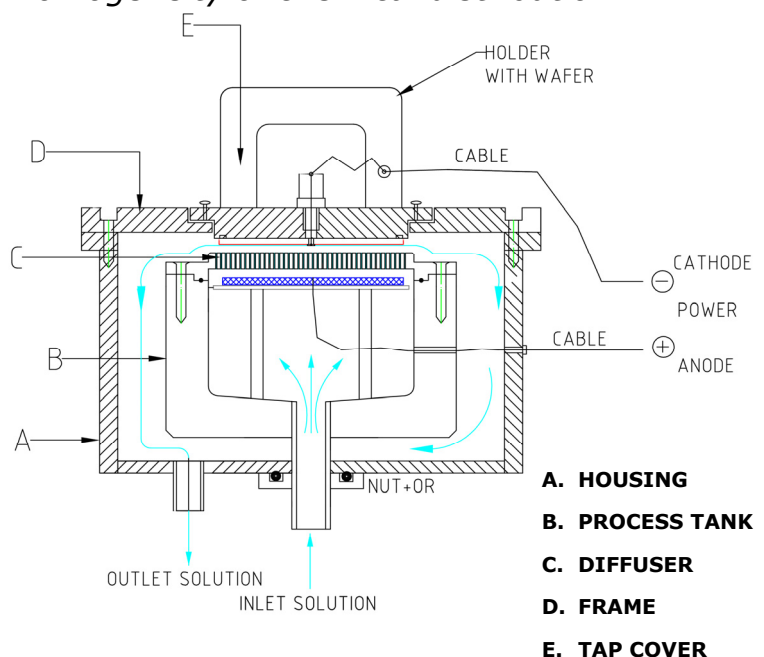
Starting with that objective SPM engineer found a new design for process tank based on the principle of floating the wafer on the chemical solution.

The "floating effect" is obtained thanks to a centrifugal pump that spread the solution from the bottom of the tank to the top. When the liquid reach a special disc, the flow change immediately its direction moving on the edge of the disc. That phenomenon creates particular waves that come out around the disc. A secondary disc (called diffuser) is placed after this. This diffuser has more or less the dimension of the wafer-solar cell-substrate you are using and it's full of high precision holes arranged concentrically.



Waves arrive in a strong way on the bottom plane of the diffuser, but they are immediately cushioned passing through the small holes. This creates on the top plane of the disc a "liquid pillow".

This particular effect permits to liquid to keep a constant level and a perfect homogeneity of chemical distribution.



PATENT PENDING

Front-end PROCESSING

31 October 2013



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PROCESS TANK

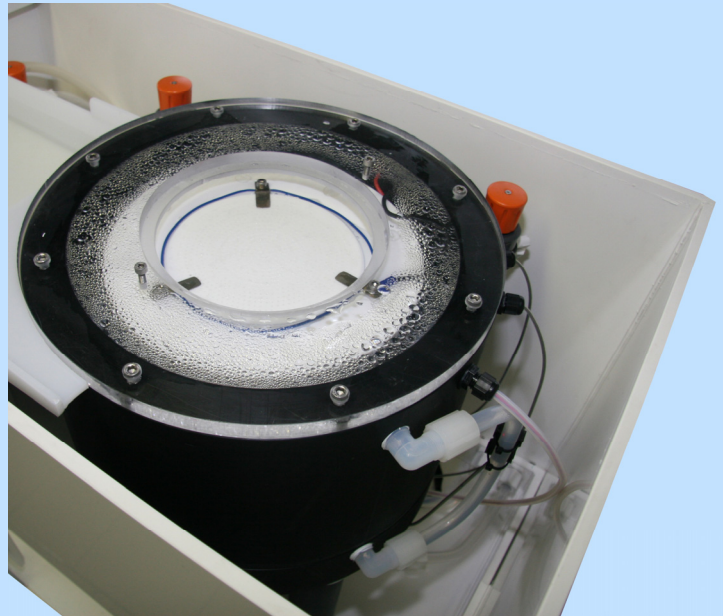
The prototype process tank is obtained lathering a PTFE cylinder. This material is electrochemically, biochemically, enzymatically, and **chemically virtually inert**.

The cylindrical shape is necessary to obtain the “pillow effect” and to warrant a very low particle deposition on tank walls, since there are no welding points and edges as on squared tanks.

A surrounding cylindrical tank (overflow) collects the solution and route it to the centrifugal pump.

The centrifugal pump integrates a filter to ensures that eventual debris coming from chemical etch will not block diffuser holes.

An infrared heater installed on the

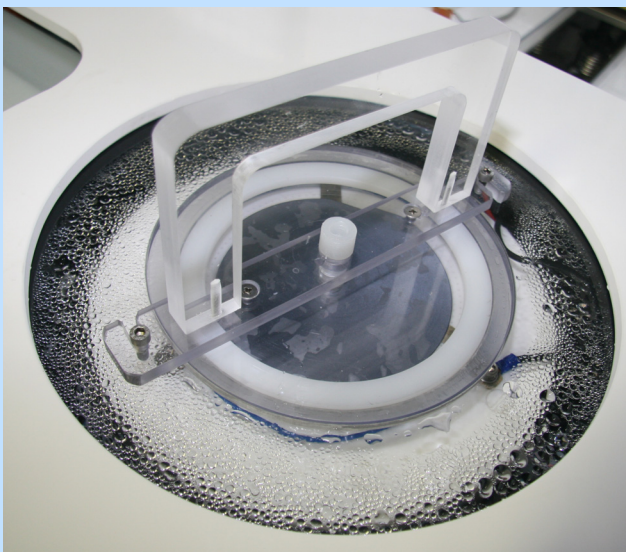


piping line heat up the solution to the temperature settled by operator.

For *electrolytic processes (OPT.)*: A Platinated titanium net (anode) is placed before the diffuser and specials contacts are fixed on the cover (cathode). When the cover closes the wafer will start to reach the current generated from the power supplier.

MANUAL COVER

The tank is equipped with special cover that includes a vacuum connection, so wafer-solar cell-substrate is held on the cover. When cover is closed, the wafer front side comes in touch with the solution. The back side is totally not affected with the process because of the floating effect that protects it from the contact with the chemical solution.



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RINSE TANK

Prototype rinse tank is shaped to surround the process tank. All drops generated after wafer removal are collected into this tank.

This tank has a depth sufficient to ensure a perfect clean of the wafer and eventually also of the entire cover (except holder).

The overflow at one side warrants a proper wafer rinse.



Prototype for Laboratory and R&D

GENERAL CONTROL

The prototype is equipped with a thermo-regulator and a timer. Specific buttons activate pump, heater and timer. At the process end, a buzzer will alert operator that process is finished.



Power Supply for Electrolytic Process

INFINITE POSSIBILITY

The prototype is designed for a simple manual process, but our idea is to develop also an automatic version. We are now working on different automatic transfer methods from process to rinse tanks, including dryer, ultrasounds and other options. We can realize "Floating effect" process tanks for every support (wafer, solar cells, substrates) and format up to 450mm of diameter. For this last format we have already realized one tank to process 450mm wafer to test diffusion behavior and we have already obtained good results also with this big dimensions tank. We are ready to propose, to interested companies, this new technology matching to our 26 years experience on semiconductor world.

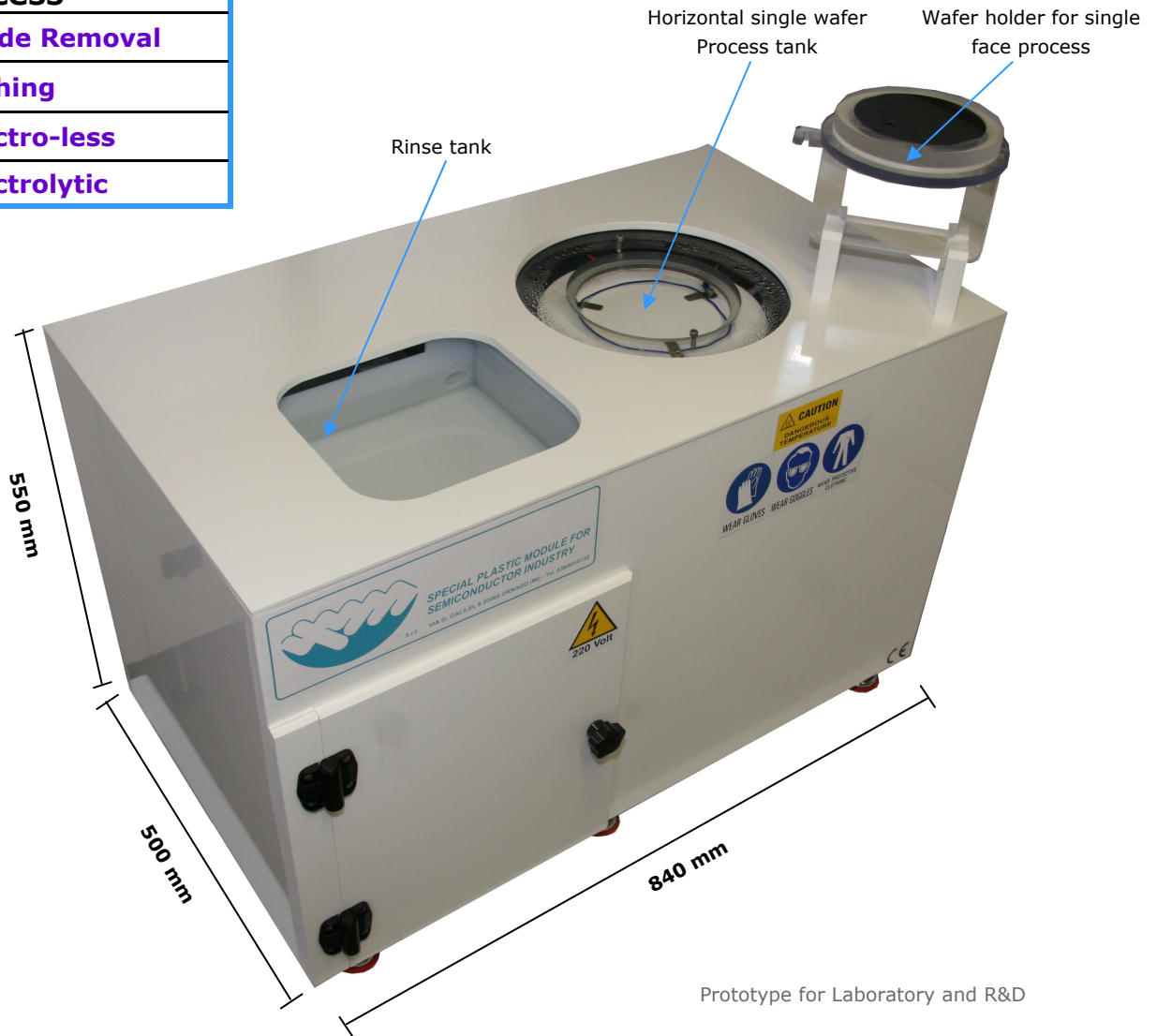


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Single Wafer "Floating Process"

Process

- Oxide Removal
- Etching
- Electro-less
- Electrolytic



For further information don't hesitate to contact us!



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