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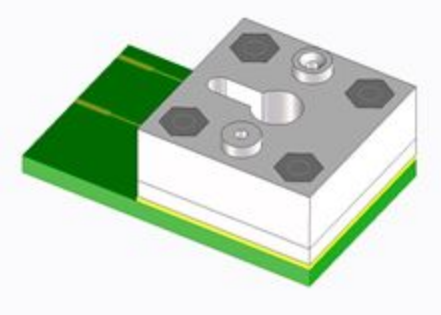
eNPR - Flow cell for Nanopore Chips: Chip testing, experimental steps and troubleshooting



This short user guide will give you an overview of how flow cells for the Nanopore Chips are assembled, their individual components and the necessary preparations before performing nanopore experiments with the eNPR.

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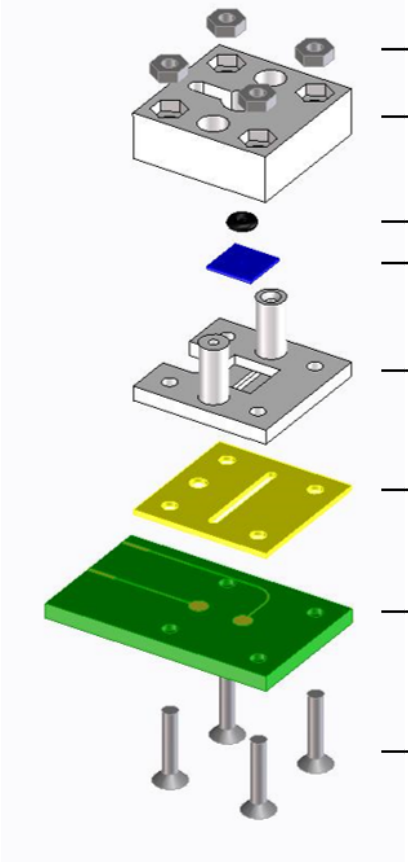
Pack stack



There are two different kinds of Nanopore Chips available. They both consist of a **SiN** layer in which the nanopore is drilled, but one type is **glass**-based and the second type is **SiO**-based.

They differ in thickness: The glass-based is **200 µm** and the SiO-based is **500 µm** thick. Please make sure to choose the correct bottom fluidic part with the correct nanopore chip thickness before using.

Assembly procedure

For the best results, the 5x5 mm silicone nitride chip should be treated with oxygen plasma.

Oxygen Plasma treatment [1]:

Expose both sides of the 5x5 mm silicone nitride Nanopore Chip to oxygen plasma.

The following parameters were established using a Gatan Model 950 Advanced Plasma System:

Time per side	2-3 min
Oxygen flow rate	40 sccm
Forward RF power	30 W

Alternative Method: Piranha Cleaning [2; 3]:

Place the nanopore containing silicone nitride Chip into a 10 ml Pyrex beaker. Be careful not to break the nitride window, as it is very delicate. Place the beaker on a hotplate in a fume hood and set it to 80 °C.

Clean the Nanopore Chip with Piranha solution using great care. First, add 3 ml sulfuric acid to the container using a glass pipette. Next, carefully add 1 ml hydrogen peroxide to the sulfuric acid to make Piranha solution 14. Please take all appropriate precautions.

Allow the Nanopore Chip to soak in Piranha solution for 5 minutes.

Remove the Piranha solution from the beaker by using a glass pipette. Afterwards, place it into a proper storage receptacle.

Fill the beaker with degassed and deionized water using a clean glass pipette. Empty the beaker of water and repeat this step at least 5 times.

Remove the Nanopore Chip with a clean pair of tweezers and dry it by using light suction.

References

[1] **Smeets R. M. M., Keyser U. F., Dekker N. H., Dekker C.** (2008) Noise in Solid-State Nanopores. Proc. Natl. Acad. Sci. U.S.A., 105(2):417-421

[2] **Wanunu M., Meller A. Selvin, P. R., Ha, T.** (2008) Single-molecule techniques: a laboratory manual. Cold Spring Harbor Laboratory Press, New York. 395-420

[3] **Niedzwiecki D. J., Movileanu L.** (2011) Monitoring Protein Adsorption with Solid-state Nanopores. J. Vis. Exp. 58:P. e3560