be fabricated using the state-of-the-art photolithography. The pores in silicon can be fabricated by exposing the silicon in an HF/ethanol solution and then subjecting the pores to an electrical current. The size and shape of the pores inside silicon can be adjusted by the doping of the silicon, electrical current application, the composition of the electrolyte solution, and etching time.

The surface of the silicon particles can be modified by many means to provide targeted delivery and on-site permanence for extended release. Multiple active agents can be co-loaded into the particles. Because the surface modification of particles can be done on wafers before the mechanical release, asymmetrical surface modification is feasible.

Starting from silicon wafers, a treatment, such as KOH dipping or reactive-ion etching (RIE), may be applied to make the surface rough. This helps remove the nucleation layer. A protective layer is then deposited on the wafer. The protective layer, such as silicon nitride film or photoresist film, protects the wafer from electrochemical etching in an HF-based solution. A lithography technique is applied to pattern the particles onto the protective film. The undesired area of the protective film is removed, and the protective film on the back side of the wafer is also removed. Then the pattern is exposed to HF/surfactant solution, and a larger DC electrical current is applied to the wafers for a selected time. This step removes the nucleation layer. Then a DC current is applied to generate the nanopores. Next, a larger electrical current is applied to generate a release layer. The particles are mechanically suspended in the solution, and etching time.

For the field test, a data logger assessed the temperatures of the water reservoir, as well as near the tip of the drink straw. For the second method, a data logger was used to track both the external and internal temperatures of the suit on a summit day. For the field test, a data logger assessed the temperatures of the water reservoir, as well as near the tip of the drink straw. For the field test, a data logger assessed the temperatures of the water reservoir, as well as near the tip of the drink straw.