Standardizing Porous Silicon to Enable Cutting Edge Research and High-Tech industrial Applications.

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Although accidentally discovered by testing the extremes of standard semiconductor processes, Porous Silicon has become a material that has exploded into so many different fields such as the medical, energy, semiconductor, and material enhancement just to name a few. Due to its relative ease of morphology tuning to enhance specific material properties and property windows, it is playing a big role in the background of many new breakthroughs. Properties such as high and specific surface area, pore volume, optical or refractive index, color etc. In combination with silicon's capabilities to not only be biocompatible, but also biodegradable, the door for insitu medical applications is also now wide open. One of the difficulties, however, of porous silicon is its flexibility. It can be used practically everywhere, and each optimized application requires slightly different material characteristics, therefore standards and industrialization has proven to be slightly difficult. At The Porous Silicon Company, a few standards have been categorized in the microporous, mesoporous, and macroporous ranges. This presentation aims at categorizing these three separate morphology ranges into common applications for each range. This should act as a roadmap to help and give researchers or industrial engineers looking to incorporate the material and give an indication of where to start and which materials to try first in order improve their current applications and give new impulses for applicatons to come.

References

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[2] Burns, Chris, 2022 25, October, A Journey through the Nano-world of Porous Silicon. From Theory to Praxis. https://www.if.tugraz.at/workshops/abstract.php?2704.

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Figures

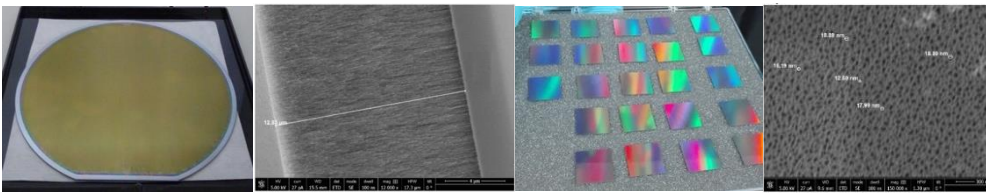

Figure 1: An assormtment of microporous, mesoporous and macroporous silicon with SEM pictures of the morphologies as well as pictures showing its optical versatility.