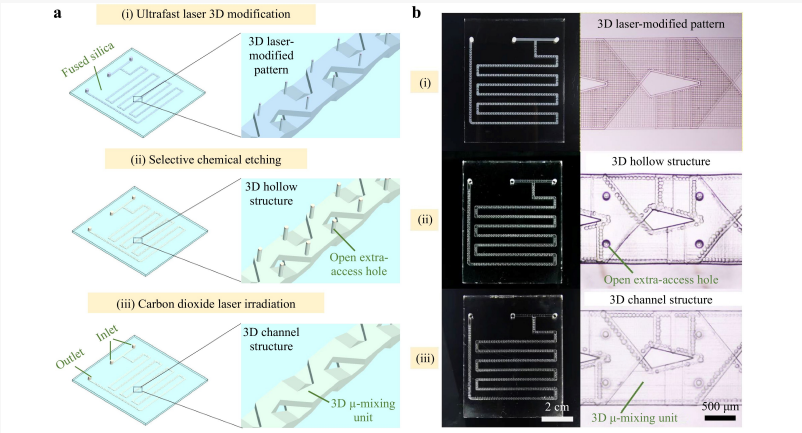
New technique paves the way for efficient Vitamin D3 production

USA, August 27, 2024 /EINPresswire.com/ -- Scientists have developed a new method for crafting intricate microfluidic channels in glass using intense laser pulses. These tiny channels offer exceptional clarity for ultraviolet (UV) light, making them ideal for continuous-flow photochemical reactions like synthesising vitamin D3. The technique paves the way for miniaturized, efficient chemical production methods with promising applications in medicine, materials science, and beyond.



Schematic of the manufacturing procedure.

Scientists have developed a revolutionary method to produce vitamin D3 (VD3), a vital nutrient for bone health and immune function, with greater efficiency and purity. This breakthrough utilizes intricately designed microchannels carved into glass using ultra-fast lasers.

These tiny channels offer exceptional transparency for ultraviolet (UV) light, the key ingredient in VD3 production. This allows for more efficient use of light, leading to higher yields of VD3 and lower production costs.

Traditionally, VD3 production relies on bulky reactors and inefficient processes. The new microfluidic approach overcomes these limitations, enabling continuous-flow production with significantly improved yield (over 20%).

"This technology represents a major leap forward in VD3 production," said [Lead researcher name], lead author of the study. "It paves the way for more affordable and readily available VD3 supplements, benefiting consumers and healthcare systems alike."

The microchannels are made from fused silica glass, chosen for its superior UV transparency and chemical resistance. Additionally, the laser carving technique allows for precise control of the channel design, optimizing mixing and flow for enhanced efficiency.

The researchers also demonstrated the platform's versatility by successfully producing VD3 using an array of UV LED lights. This opens doors for future miniaturization and integration of VD3 production into portable devices.

This innovative approach holds immense potential beyond VD3. Its ability to handle complex reactions under high temperatures and pressure makes it suitable for a wide range of chemical synthesis applications, from pharmaceuticals to materials science.

The future of vitamin D3 production looks bright, thanks to this cutting-edge technology. With its enhanced efficiency, purity, and potential for miniaturization, it promises to revolutionize how we access this essential nutrient.

DOI
10.37188/lam.2024.010

Original Source URL
https://doi.org/10.37188/lam.2024.010

Funding information
This work was supported by the National Natural Science Foundation of China (Grant Nos. 12174107, 61991444, 11933005, 12192251, and 12334014), National Key R&D Program of China (Grant No. 2019YFA0705000), Science and Technology Commission of Shanghai Municipality (Grant No. 21DZ1101500), Shanghai Municipal Science and Technology Major Project, and Fundamental Research Funds for the Central Universities.

Lucy Wang
BioDesign Research
email us here