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Substrate for liquid samples in confocal Raman equipment that reduces Raman mapping from 2D to 1D

Raman Spectroscopy is an accurate technique for the chemical characterisation of samples. However, in the case of liquid samples where the components of interest are present in low concentrations, it remains a challenging procedure that usually requires multiple measurements covering the sample point by point [1]. In this work, we propose a substrate with a recess in fused silica glass, designed to optically guide the Raman laser along a transverse line that crosses the area, scanning it line by line, thereby reducing the time required per sample measurement. The dimensions of the system were determined using ray tracing simulation, and the proof-of-concept device was fabricated on glass using an ultrafast laser-assisted etching technique, ULAE [2].

References

- [1] Sebastian Schlücker, Michael D. Schaeberle, Scott W. Huffman, Ira W. Levin, *Analytical Chemistry*, 16 (2003), 4312–4318
- [2] Ochoa, M., Roldán-Varona, P., Algorri, J. F., López-Higuera, J. M., Rodríguez-Cobo, L., *Lab on a Chip*, 7 (2023) 1752–1757.

Figures

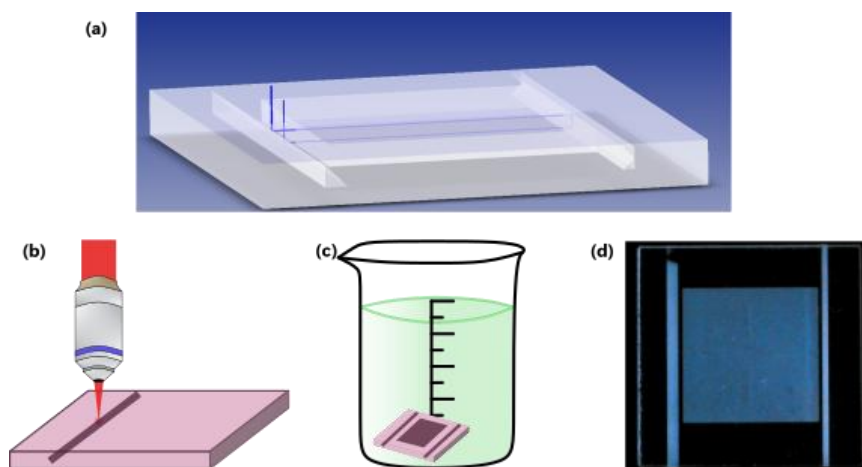


Figure 1: (a) CAD representation of the designed substrate in ray-tracing simulation software. (b) and (c) are schematics of the two-steps fabrication technique employed: the laser inscription (b) and the wet chemical etching (c). The image show in (d) corresponds to the proof-of-concept already under trial.