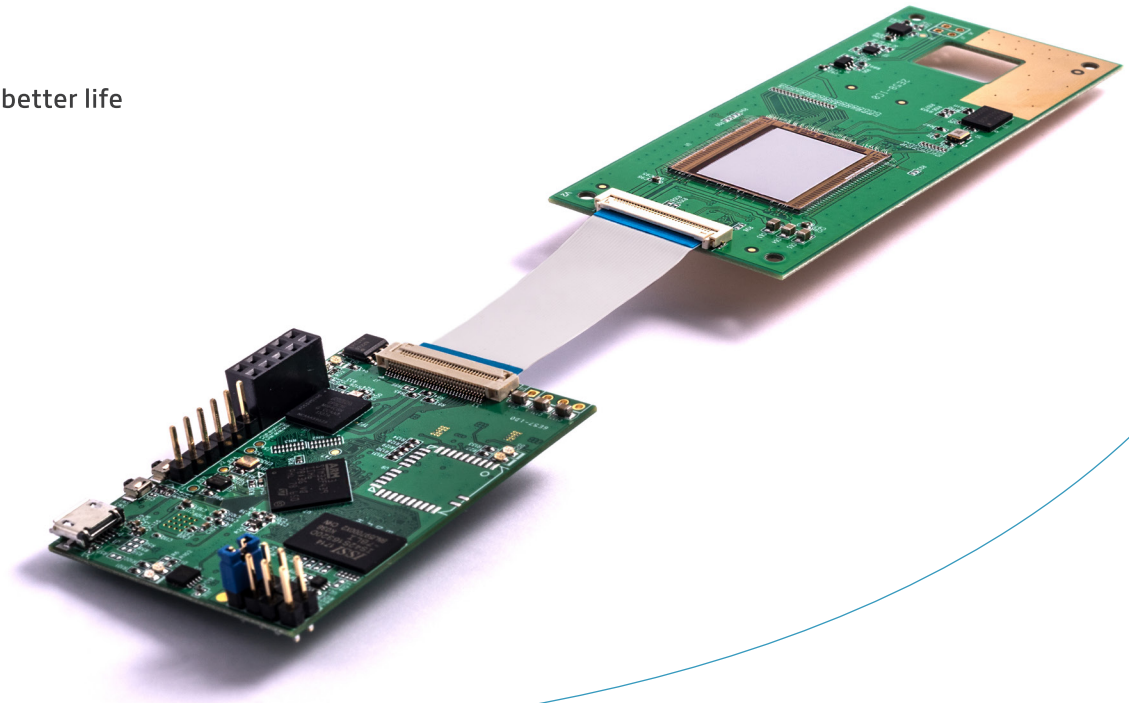
imec

embracing a better life



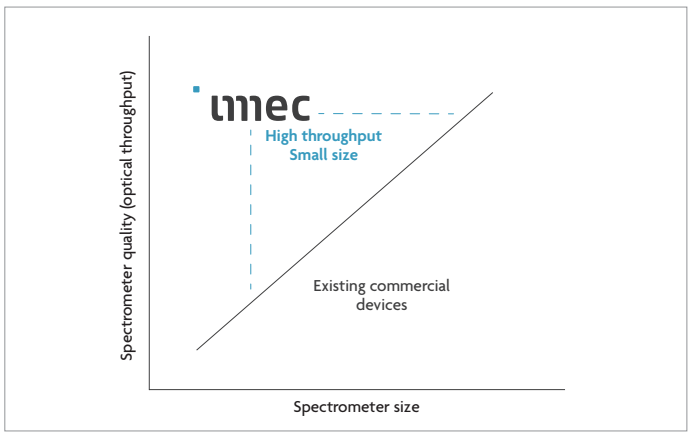
ENABLING HANDHELD HIGH-END RAMAN SPECTROSCOPY

PATENTED CONCEPT AND ON-CHIP SOLUTION FOR RAMAN SPECTROSCOPY PROVIDING HIGH OPTICAL THROUGHPUT AND HIGH SPECTRAL RESOLUTION.

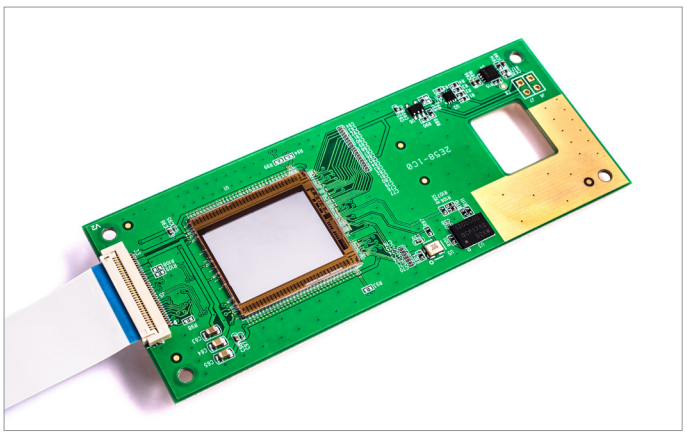
Imec presents an on-chip solution that allows to build an entirely new type of Raman spectrometer, 1000 times smaller in volume than a bench-top tool, while still exhibiting similar or even improved optical throughput.

THE GAP IN THE MARKET

There is not yet a high-end handheld Raman spectroscopy device available on the market. Because of the inherent nature of the technique, existing devices are rather bulky (tabletop) and have a price range of a few hundred thousand dollars/euros. Handheld solutions exist, but for the moment fail to reach the desired performance for high-end applications.



Imec technology allows to realize high-end Raman spectroscopy in a small-scale device.



Imec's on-chip solution for Raman Spectroscopy.

BUSINESS OPPORTUNITY

Imec reaches out to OEMs and technology developers to further develop its technology into a market-ready application. Be it as a dedicated handheld device or integrated in existing devices such as a smartphone.

THE IMEC SOLUTION

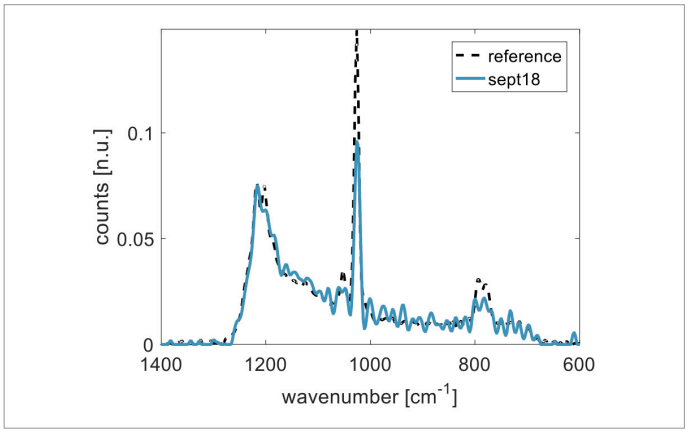
Thanks to a new concept, using integrated photonics and for which a patent is pending, imec has been able to overcome the performance barrier in small-scale Raman spectroscopy devices. Rather than using classic dispersive optics, imec bases its technology on interference-based spectroscopy, which is used in well-known Fourier-transform (FT) spectroscopy. The interferometers are implemented on-chip using integrated waveguide photonics. To match the optical throughput and to avoid moving parts, the waveguide interferometers are massively parallelized monolithically on top of a CMOS image sensor. In this way, both high optical throughput and high spectral resolution can be reached in a miniaturized device. The whole system is free of mechanical components and is built in imec's PECVD SiN platform, which guarantees robustness and compatibility with high-volume (so low cost) manufacturing.

APPLICATIONS

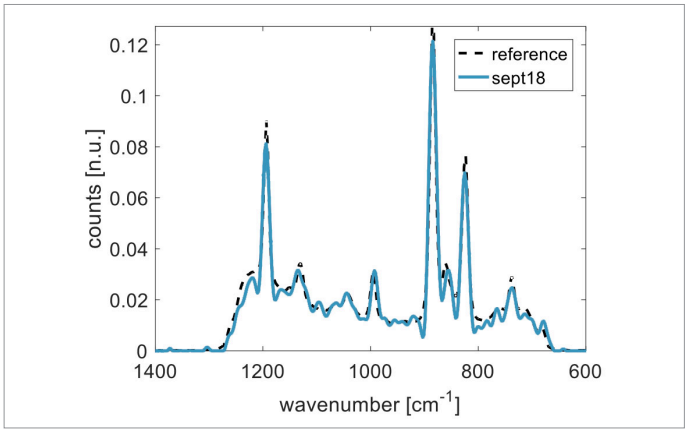
Raman spectroscopy is a powerful technique, most often used to determine chemical material compositions. Application areas include material analysis, quality control etc. in a variety of sectors:

- Food
- Pharma
- Healthcare
- Cosmetics
- (Petro)chemical industry
- Space exploration

Demonstrator device for handheld high-end Raman spectroscopy.



Comparison of imec readout spectra show high correlation with a commercial reference device: benzonitrile.



Comparison of imec readout spectra show high correlation with a commercial reference device: acetaminophen.

CONTACT US

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