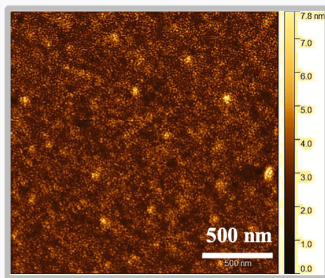


FEBRUARY 2020 NEWSLETTER

REDFINCH is an EU H2020 research project aimed at developing Photonic Integrated Circuits (PICs) at mid-infrared wavelengths, in order to realise compact chemical sensors for both gas and liquid. Specific targeted applications within the project include; process gas analysis in refineries, gas leak detection in petrochemical plants, and milk protein analysis for the dairy industry.

Research Highlight – MBE Growth of GaSb on Silicon

"Molecular-beam epitaxy of GaSb on 6°-offcut (001) Si using a GaAs nucleation layer" - J. Crystal Growth, 529, 125299 (2020)



To realise truly multi-wavelength PIC sensors in the mid-infrared region, the ability to grow GaSb-based lasers directly on Si substrates is a key goal. The GaSb materials allow access to the longer (>2 μm) MIR wavelengths, while monolithic integration on Si would allow compatibility with CMOS technologies. The researchers at **Université de Montpellier** have made significant progress in this area, as detailed in a recent paper published in the *Journal of Crystal Growth*. The paper describes the achievement and detailed characterisation of high-quality GaSb layers grown on Si, utilising a GaAs nucleation layer. The nucleation layer (NL) helps prevent the formation of large 3D islands of GaSb during the early stages of growth, which are known to be detrimental to layer quality. The REDFINCH researchers have shown that using a GaAs NL produces significantly better results than the alternative AlSb NL.

Read the full paper here: <https://dx.doi.org/10.1016/j.jcrysgro.2019.125299>

REDFINCH @ SPIE Photonics West 2020, 1-6 February 2020

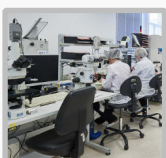
Talks by REDFINCH researchers

- **Sun 2nd Feb:** "Enabling low-cost QCL by large scale fabrication on CMOS pilot line" (Invited Paper), J.-G. Coutard et al., *Quantum Sensing and Nano Electronics and Photonics XVII: Quantum Cascade Lasers I*
- **Mon 3rd Feb:** "Toward mid-IR optoelectronic devices on silicon-photonic integrated circuits"; L. Monge-Bartolome et al., *Silicon Photonics XV: Photonic Integration*
- **Tues 4th Feb:** "Room-temperature CW operation of GaSb laser diodes grown on on-axis (001) Si substrates"; M. Rio Calvo et al., *Novel In-Plane Semiconductor Lasers XIX: Lasers on Silicon*
- **Wed 5th Feb:** "Micro PA detector: pushing the limits of mid IR photoacoustic spectroscopy integrated on silicon" (Invited Paper), J.-G. Coutard et al., *Silicon Photonics XV: Optical Detection & Sensing I*
- **Wed 5th Feb:** "Ge platforms for mid-infrared applications" (Invited Paper), J.-M. Fédéli et al., *Smart Photonic and Optoelectronic Integrated Circuits XXII: Mid-Infrared Optoelectronics I*
- **Thur 6th Feb:** "InAs/AlSb quantum-cascade lasers monolithically integrated on silicon" (Invited Paper), A. N. Baranov et al., *Novel In-Plane Semiconductor Lasers XIX: QCLs: Novel Design & Integration*

Visit **CEA-Leti** at **Stand 857** in the French pavilion, Hall B

Visit **mirSense** at the **RPMC Lasers Stand 1643, 1741, 1743** in Hall C

Visit **Photonics Ireland** at **Stand 4163** in Hall F

REDFINCH Project Meeting, Trutnov


The sixth REDFINCH project face-to-face meeting was held in Trutnov, Czech Republic on 7th November 2019. The event was hosted by partner Argotech, and included a lab tour of their production site.

Other REDFINCH Publications

- Schwaighofer, A., et al., *Spectrochimica Acta Part A*, 226, 117636 (2020) <https://dx.doi.org/10.1016/j.saa.2019.117636>
- Glière, A., et al., *Int. J. Thermophys.*, 41 (2), 16 (2020) <https://dx.doi.org/10.1007/s10765-019-2580-7>
- Lindner, S., et al., *Applied Spectroscopy* (2020) <https://dx.doi.org/10.1177/0003702819892646>