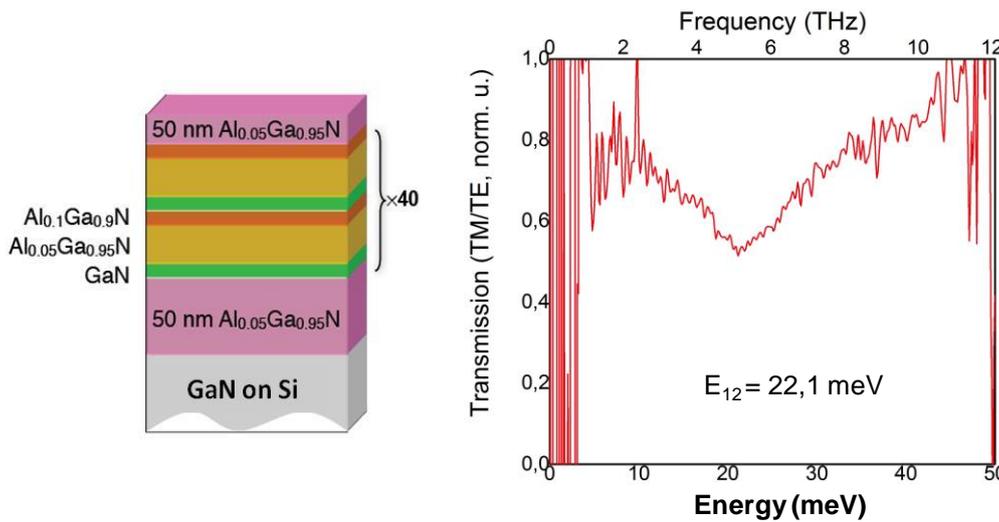
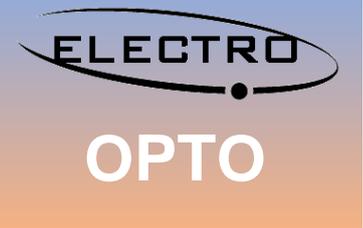


THz intersubband absorption in GaN based heterostructures grown on Silicon substrate



Left: schematic cross section view of the AlGaN/GaN step multiquantum well structure grown on Silicon at CRHEA.

Right: TM polarized ISB absorption in a structure grown by MOCVD on Si(110). Measurements performed at C2N.

GaN on Silicon for THz detectors

AlGaN/GaN heterostructures present interesting features for optoelectronic devices working in the TeraHertz (THz) range:

1. the possibility to build periodic heterostructures with energy levels separated with few tens of meV;
 2. a large optical phonon energy which may enable the electron population inversion in quantum cascade lasers (QCLs) at room temperature.
- Furthermore, the fabrication of AlGaN/GaN quantum cascade detectors (QCDs) on a THz

transparent substrate like high resistivity Silicon is very interesting for use at large scale. The demonstration of TM polarized absorption of THz radiations within AlGaN/GaN heterostructures grown either by MOCVD or by MBE is a proof of intersubband (ISB) absorption process and is a first step in the development of such devices.

Breakthroughs

ISB absorption in structures grown on Si(111) and Si(110) either by MOCVD or by MBE.

Perspectives

Development of GaN based THz quantum cascade detectors on Silicon; development of THz emitters.

Collaborations : C2N, III-V lab

More information : <http://www.crhea.cnrs.fr/OptoTeraGaN/> ; A.Jollivet, PhD thesis Univ. Paris Saclay, 18 Feb. 2019

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