Nano Scale Disruptive Silicon-Plasmonic Platform for Chip-to-Chip Interconnection

Grown wafer structure for plasmonic lasers

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Executive Summary

This report describes the characteristics of the InP-based wafer grown at TU/e, which enables us to start the fabrication of the plasmonic/metallo-dielectric laser. Its growth has been carried out with MOVPE (Metalorganic Vapour Phase Epitaxy). Prior to its growth, the definition of the layerstack was defined based on the devices to fabricate.

Change Records

Version	Date	Changes	Author
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Characteristics of wafer

After the definition of the laser devices reported in deliverable 3.1, the layerstack has been defined in ordert to grow the wafers required for the fabrication. Figure 1 shows the characteristics (material, thicknesses and doping levels) of the wafer that has been grown in the clean room facilities of TU/e.

Color code	Material	Thickness [nm]	Doping
	InP	50	N > $5x10^{18}$
	InGaAs	50	N > $1x10^{19}$
	InP	100	N > $5x10^{18}$
	InP	100	N = $5x10^{18}$
	InP	100	N = $1x10^{18}$
	InGaAs	350	n.i.d.
	InP	100	P = $3x10^{17}$
	InP	100	P = $5x10^{17}$
	InP	50	P = $1x10^{18}$
	Q 1.25	50	P = $2.4x10^{19}$
	InP	100	P = $1x10^{18}$
	InP	100	
	InP	Substrate	n.i.d.

Figure 1. Layerstack of grown wafer on a non-intentionally-doped (n.i.d.) InP substrate. The bottom layer describes the substrate, whereas the top layer is a protection layer that has to be removed before the actual processing of the wafer.

A single wafer with the aforementioned characteristics has been grown in order to start experimental activities. A number of wafers will be required for the development of the fabrication process for the laser. Subsequent wafers, possibly with a modified layer structure, will be ordered when needed..