

Second butt joint for low loss waveguides

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We present a new integration scheme for the InP based platform to produce low loss passive elements in photonics integrated circuits (PICs). This method consists of performing an additional butt joint in the top layer of our wafers. This allows to have two different top claddings on the same wafer, one optimized for active and one optimized for passive elements. The difference between the two top claddings is that one is heavily doped while the other is mainly undoped. In PICs doping is necessary to allow electrical contacting of active components such as lasers and modulators. The dopant element is known to cause intraband optical absorption and optical losses of more than 3dB/cm are considered common. Our simulations suggest losses as low as 1 dB/cm with the optimized top claddings. We have experimentally verified the differences in losses between the different layerstacks. We fabricated four wafers and measured the losses: one wafer has a standard layerstack, two wafers the new integration scheme and a reference wafer with no doping. We fabricated three different test structures to measure losses and three different waveguide widths both for deep and shallow waveguides. We will present the obtained improvements of the alternative layerstacks.