Polarization diversity grating couplers in bonded InP-membranes

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Coupling to fiber is an important problem for future optical communication networks. The large mode mismatch between fiber and nanophotonic waveguides induces large coupling losses. In addition, the polarization state of the light in the fiber is not known and varies with time, while the photonic components on chip in a lot of cases (and especially in high refractive index contrast material systems) are very polarization sensitive. An elegant solution is to use compact grating couplers for (near) vertical coupling between fiber and waveguide. To tackle the polarization problem, a 2D-grating coupler in a polarization diversity configuration can be used.

Recently, we have experimentally demonstrated coupling efficiencies of 56% from single-mode fiber to waveguides in BCB-bonded InP-membranes using grating couplers with a gold mirror under the grating [1]. Here, we report experimental results on polarization diversity couplers. The gratings have dimensions of 12x12 μm^2 and the Polarization Dependent Loss (PDL) is determined by changing the input polarization over time and measuring the variation in output power. This results in a measured fiber-to-fiber PDL of 0.7 dB.

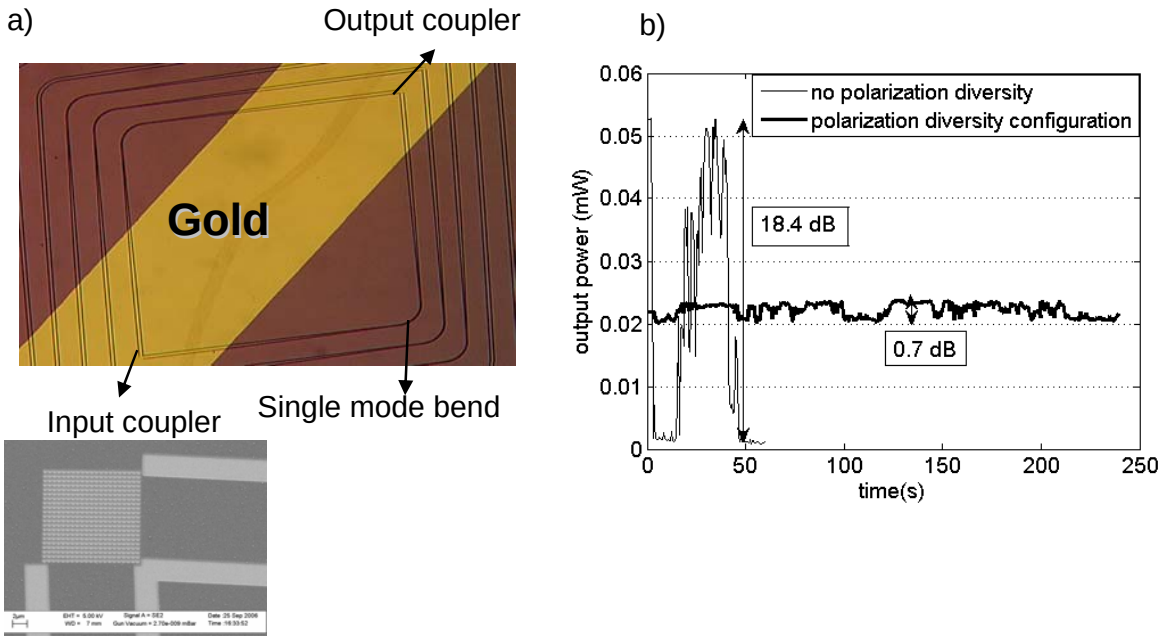

Fig. 1. a) 2D-grating couplers in a polarization diversity configuration. b) Fiber-to-fiber PDL measurement. Output curves are measured on different samples and power values are not comparable.

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