CHARACTERIZATION OF THERMO-OPTICAL 2X2 SWITCH CONFIGURATIONS MADE OF DIELECTRIC LOADED SURFACE PLASMON POLARITON WAVEGUIDES FOR TELECOM ROUTING ARCHITECTURE

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Abstract: We report on experimental characterization of Dielectric Loaded Surface Plasmon Polariton Waveguide (DLSPPW) thermo-optic switches structures for high data bit rate transfer. The development of active components made of DLSPPWs is a promising ways to integrate photonics components on-chip. DLSPPWs are comprised of a dielectric ridge (usually a polymer) with a typical cross-section of 0.5x0.5 µm² deposited onto a thin metal film [1, 2]. The fundamental mode travelling along these waveguides is a plasmonic quasi-TM polarized mode. Many passives components based of DLSPPW have been demonstrated [3, 4] and an efficient coupling of DLSPPW waveguides with SOI optical circuitry has been reported [5]. Beyond passive components, dynamically controlled DLSPPW based devices are of practical interest. In this context, owing to the potentially large thermo-optical coefficient of the dielectric load, thermally activated DLSPPW devices have been proposed [6]. In this work, we focus onto thermally controlled switches relying on either X-add-drop or Dual Mode Interference configurations. The performances of the switches are extracted from leakage radiation microscopy images. The experimental characterizations reveal extinction ratio larger than 5dB over bandwidth larger than 4.5nm.

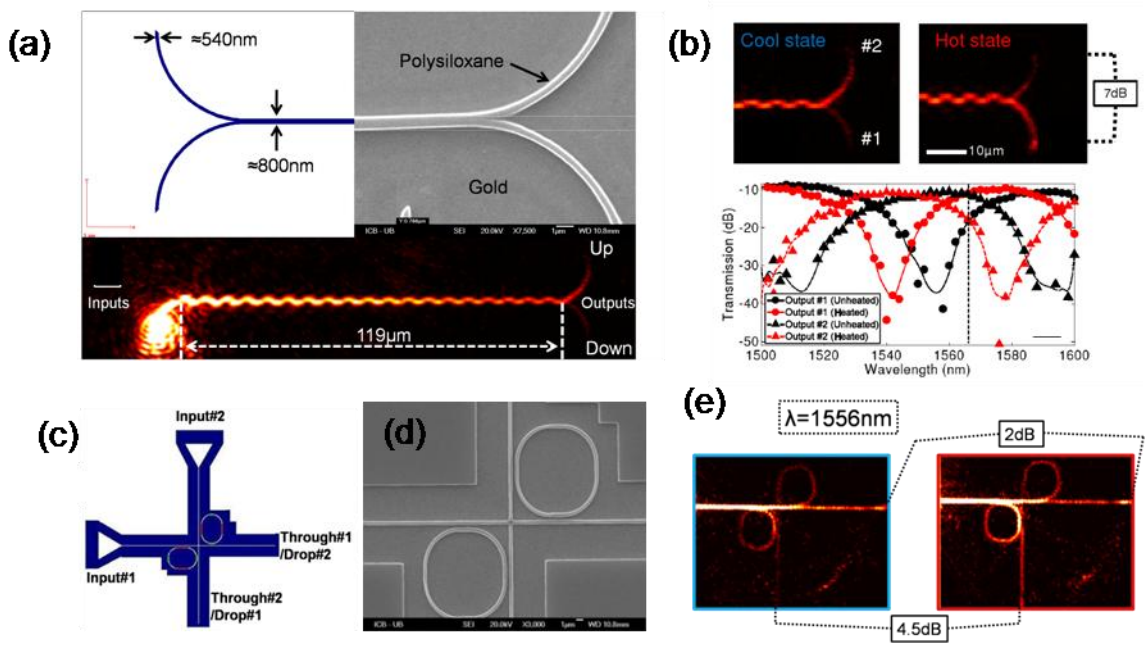

Figure 1: (a) Three different views of a Mutli-Mode Interferometer structure (schematic view, Scanning Electron Microscopy (SEM) image, and Leakage Radiation Microscopy (LRM) picture). **(b)** LRM images of the MMI device at two different temperature states and the corresponding spectra. **(c)** Schematic view of an X-Add-Drop switch configuration. **(d)** SEM picture of an X-Add-Drop switch structure. **(e)** LRM images of an X-Add-Drop device at two different temperature states.

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