FE DE ERRATAS

Título de tesis: "Polymer-based waveguides and devices for photonic integrated circuits and sensing"

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Pág. V, línea 3	"A very good correlation between the simulated and experimental measurements was revealed" se sustituye por "A good correlation between the simulated and experimental measurements was reached"
Pág. 1, línea 8	"few tens of devices." se sustituye por "few tens of devices per mm^2."
Pág. 2, perteneciente a la Introducción	El siguiente párrafo se encuentra repetido: "Polymer PICs operate at visible and near IR wavelengths, same as most used organic dyes. In optical biosensing field, dyes are employed both for light generation and detection [14]. Organic dye lasers can be integrated in the same polymeric platform to overcome fiber-to-chip coupling constraints [15]. In optical sensors, it is a regular practice that dyes are used for sensor functionalization. Target molecules or pathogens are detected when bonded to a specific dye, generally using specifically marked antibodies, maximizing the optical change in the measuring medium. Moreover, polymers commonly used in microfabrication are often biocompatible, which is fundamental for building microfluidic channels, implants or living cell scaffolds. This make polymer PICs one of the best option to integrate next generation of biosensors [16–19]."
Pág. 5, línea 9	Figure text: "Illustration of various integrated planar waveguides [20]. (a) Buried or

	embedded channel waveguide, (b) strip-loaded waveguide, (c) ridge waveguide and (d) rib waveguide are shown." se sustituye por "Illustration of various integrated planar waveguides. (a) Buried or embedded channel waveguide, (b) strip-loaded waveguide, (c) ridge waveguide and (d) rib waveguide are shown [20]."
Pág. 9, línea 11	Reference [23] added to Figure 1.6
Pág. 11, línea 16	"In the other hand" se sustituye por "On the other hand"
Pág. 11, línea 24	"Fig. 1.10.depicts" se sustituye por "Fig. 1.10 depicts"
Pág. 13, línea 7	Ecuaciones 1.8 y 1.9 $$\Delta\Phi = \frac{2\pi\Delta\Delta\left(L \cdot n_{eff}\right)}{\lambda}$$ $$P_{out1,\ out2} = \frac{P_{in}}{2}(1 + cos\ \Delta\Phi)$$ se sustituye por $$\Delta\Phi = \frac{2\pi\Delta\left(L \cdot n_{eff}\right)}{\lambda}$$ $$P_{out2,\ out1} = \frac{P_{in}}{2}(1 \pm cos\ \Delta\Phi)$$
Pág. 20, línea 11	"inches" se sustituye por "inch"
Pág. 21, línea 13	"For this reason, the maximum transversal dimension for waveguides was set to 2 μm" se sustituye por "Hence, to ensure single-mode guiding, the maximum transversal dimension for waveguides was set to 2 μm"

Pág. 21, línea 16	Figure Text. “First and second order transverse electric (TE)mode of a 2x2 μm polymeric waveguide at 633 nm source light. Water is employed as upper cladding and maximum electric field is represented in yellow color. Each contour line represents a decay of 3dB in electric field intensity.” se sustituye por “First and second order transverse electric (TE) mode of a 2x2 μm polymeric waveguide made in Epocore on Epoclad with water as upper cladding using a 633 nm light source. The maximum electric field is represented in yellow color. Each contour line represents a decay of 3dB in electric field intensity.”
Pág. 24, línea 14	“Klayout” se sustituye por “KLayout”
Pág. 29, línea 4	“In the other hand” se sustituye por “On the other hand”
Pág. 29, línea 25	“In the other hand” se sustituye por “On the other hand”
Pág. 34, línea 1	“CEMDATIC is showed” se sustituye por “CEMDATIC is shown”
Pág. 34, línea 7	“aan optical pinhole” se sustituye por “an optical pinhole”
Pág. 34, línea 10	“precisely starting atin 1 mm” se sustituye por “precisely starting at a minimum of 1 mm”
Pág. 34, línea 13	“The pPinhole” se sustituye por “The pinhole”

Pág. 34, línea 14	“X and Y direction was became more uniform” se sustituye por “X and Y direction became more uniform”
Pág. 34, línea 16	“the setup was compatible with other techniques at the same time as laser ablation.” se sustituye por “the setup was compatible laser ablation.”
Pág. 35, línea 1	“kapton” se sustituye por “Kapton”
Pág. 35, línea 18	“When using tracking mode, ATF laser is constantly probing sample’s surface.in a close loop with motion stage controller. If layer thickness variation is too big during the measure, motion stage is not able to follow the change and the system fails.” se sustituye por “When using tracking mode, ATF laser is constantly probing sample’s surface in a close loop with motion stage controller. If layer thickness variation is too big, the motion stage is not able to follow the change and the system fails.”
Pág. 36, línea 7	“much-improved” se sustituye por “improved”
Pág. 36, línea 10	“Apart from these instances the propagation speed was constant which led to a constant dosage to all the exposed waveguide from start to end, apart from the initial and final accelerations.” se sustituye por “Apart from these instances the propagation speed was constant which led to a constant dosage to all the exposed waveguide from start to end.”
Pág. 36,	“no matter it was two straight lines or combination between straight and

línea 17	curved lines." se sustituye por "no matter if these were two straight lines or a combination of straight and curved lines."
Pág. 37, línea 6	"At that point, drawing possibilities were reduced and geometries could not be filled." se sustituye por "At this point in time, drawing possibilities were limited to vector graphics and algorithms for filled geometric structures were unavailable."
Pág. 37, línea 21	"designs" se sustituye por "designs."
Pág. 38, línea 6	"Pattern multilayer segmentation must be improved as well as structural adhesion." se sustituye por "The conclusion of the study was that the multilayer pattern segmentation must be improved as well as the material adhesion to the substrate."
Pág. 38, línea 24	"achieveable" se sustituye por "achievable"
Pág. 41, línea 4	"division" se sustituye por "part"
Pág. 41, línea 6	"division" se sustituye por "part"
Pág. 41, línea 6	"proper operation" se sustituye por

	"optical functionality"
Pág. 41, línea 7	"Other characterization methods were out of the study because no variation was observed or lacking necessary equipment (thermal, humidity, strain, aging, chemical, etc.)." se elimina.
Pág. 42, línea 23	"thickness is not uniform" se sustituye por "thickness may not be uniform"
Pág. 43, línea 13	Reference [48] added to Figure 2.18
Pág. 45, línea 23	"x,y" se sustituye por "x, y"
Pág. 46, línea 4	"ROI" se sustituye por "relevant regions of interest (ROI)"
Pág. 47, línea 19	"very small" se sustituye por "small"
Pág. 47, línea 19	"width" se sustituye por "wide"
Pág. 48, línea 4	"two different people" se sustituye por "two different researchers"
Pág. 48, línea 8	Figure text: "PICS" se sustituye por "PICs" Reference [50] added to Figure 2.21.

Pág. 48, línea 21	"mode dispersion inside" se sustituye por "light leakage into"
Pág. 49, línea 2	"designing parameter" se sustituye por "design parameter"
Pág. 49, línea 18	"remain unaffected to coupling variations" se sustituye por "remain unaffected by coupling variations"
Pág. 51, línea 6	"PICs was" se sustituye por "PICs were"
Pág. 51, línea 12	"design" se sustituye por "designed"
Pág. 51, línea 13	"pf" se sustituye por "of"
Pág. 51, línea 14	"Output light is captured and presented vs applied voltage" se sustituye por "Output light was recorded together with the applied voltage"
Pág. 51, línea 17	"test waveguide optical properties tuning" se sustituye por "characterize the effective refractive index variation"
Pág. 51, línea 12	"PICs" se sustituye por "PIC"
Pág. 52, línea 13	"The PIC was designed as part of a photonic chip design course and manufactured by VLC Photonics S.A. Platform is produced over a 500 μm thick wafer which is oxidized to get up to 3 μm silicon oxide isolating layer

	and working as bottom cladding of the PIC." se sustituye por "The PIC was designed as part of a photonic chip design course and manufactured externally by VLC Photonics S.A. The substrate was a 500 μm thick wafer which is oxidized to get up to 3 μm silicon oxide isolating layer and working as bottom cladding of the PIC."
Pág. 52, línea 17	"Then a 1.5 μm layer of silicon oxide is deposited" se sustituye por "Then a 1.5 μm layer of silicon oxide is selectively deposited"
Pág. 52, línea 20	"LC cell filling and sealing is detailed explained in 0" se sustituye por "LC cell filling and sealing is explained in detailed in [32]"
Pág. 53, línea 8	"while variating LC voltage." se sustituye por "while varying LC voltage."
Pág. 53, línea 10	"exited" se sustituye por "excited"
Pág. 53, línea 11	"A 633nm He-Ne laser is coupled is placed in optical output coming out of the was characterized while variation LC volume refractive index. Variation in the LC orientation causes a refractive index to change in the material, and hence in the hybrid waveguide effective refractive index also." se sustituye por "A 633nm He-Ne laser is coupled into the PIC and the optical output was recorded as a function of the applied field. The electric field causes the LC molecule to reorient, and consequently changes the effective refractive index of the cladding and hence of the hybrid waveguide effective

	refractive index also for TM polarized light”
Pág. 53, línea 13	“cause” se sustituye por “causes”
Pág. 54, línea 6	“In the other hand, LC is robust against electric interferences that metallic heaters are affected.” se sustituye por “On the other hand, LC is insensitive to electric interferences unlike metallic heaters.”
Pág. 54, línea 7	“This is interesting for applications in on-board technologies for example.” se elimina
Pág. 54, línea 22	“that are used” se sustituye por “that they are used”
Pág. 55, línea 20	“calculated by equation” se sustituye por “calculated analytically”
Pág. 56, línea 12	“to” se sustituye por “two”
Pág. 57, línea 18	“Error! Reference source not found” se sustituye por “equation (3.2)”
Pág. 58, línea 5	“From **Fig. 3.6**the previous figure, it is shown how simulated output power ratio variates with MMI length” se sustituye por “**Fig. 3.6** shows how the simulated output power ratio varies with MMI length”
Pág. 58,	“fabricated”

línea 16	se sustituye por “made”
Pág. 58, línea 17	“[REFERENCE]” se sustituye por ”[39]”
Pág. 59, línea 2	“area for different samples” se sustituye por “area of different samples”
Pág. 59, línea 7	“Single le electron microscopy (SEM)” se sustituye por “Scanning electron microscopy (SEM)”
Pág. 59, línea 20	“(see **Fig. 3.7Fig. 3.4**b) and c))” se sustituye por “(see **Fig. 3.7**, b) and c))”
Pág. 59, línea 21	“Even if the dicing saw does not break any waveguide, it always scratches sample’s edge while spinning Polymer thermal expansion is also a problem during fabrication thermal treatments creating strata in the polymer layers and material uniformity worse. For this reason,” se sustituye por “Even if the dicing saw does not break any waveguide, it always scratches sample’s edge. Polymer thermal expansion is also a problem during fabrication since thermal treatments may create strata in the polymer layers and worsen material uniformity. For these reasons,”
Pág. 60, línea 9	“MMI fabricated” se sustituye por “manufactured MMI”
Pág. 63, línea 5	“ideation” se sustituye por “concept”
Pág. 64,	“electromagnetic”

línea 8	se sustituye por “electric”
Pág. 64, línea 23	Se seccion 4.2 Outlook sustituye por: This work paves the way for open-source design of integrated optical devices based on polymer materials. Some of the outlooks suggested for future research are: • Study polymer adhesion and biofunctionalization to target an specific analyte on the circuit surface. • Complete the PDK with more complex integrated devices and circuits such as gratings, NXN multiplexers, interconnections, etc. • Increase the number of polymer materials processed by maskless lithography techniques. Nanoimprint lithography or roll-to roll technique may be considered for circuit replications. • Integrate organic fluorescent dyes in the polymer PIC as light sources so that external source coupling is unnecessary.
Pág. 67, línea 14	“from” se sustituye por “by”
Pág. 68, línea 5	“suit” se sustituye por “a suit”
Pág. 68, línea 20	“excite” se sustituye por “excites”
Pág. 70, línea 6	“program” se sustituye por “programs”
Pág. 71, línea 15	“hold” se sustituye por “held”
Pág. 72,	“handling” se sustituye por “handle”

línea 2	
Pág. 75, línea 4	“into in” se sustituye por “into”
Pág. 85-88	1. D. Pérez, I. Gasulla, P. D. Mahapatra, and J. Capmany, "Principles, fundamentals, and applications of programmable integrated photonics," Adv. Opt. Photon., AOP **12**, 709–786 (2020). 2. C. Qiu, X. Ye, R. Soref, L. Yang, and Q. Xu, "Demonstration of reconfigurable electro-optical logic with silicon photonic integrated circuits," Opt. Lett., OL **37**, 3942–3944 (2012). 3. J. Faneca, T. D. Bucio, F. Y. Gardes, and A. Baldycheva, "Reconfigurable photonic integrated circuits (RPICs) based on functional materials for integrated optical communication applications," in *Silicon Photonics XV* (SPIE, 2020), Vol. 11285, pp. 203–215. 4. Y. Zhang, M. Schneider, L. Eisenblätter, et al., "Multimode interferometers for integrated transceivers on 250 nm SOI platform," J. Inst. **15**, P02022–P02022 (2020). 5. H. Liang, R. Soref, and J. Mu, "Compact polarization splitter based on a silicon angled multimode interferometer structure," Appl. Opt., AO **58**, 4070–4074 (2019). 6. S. Nevlacsil, P. Muellner, M. Sagmeister, J. Kraft, and R. Hainberger, "Broadband low loss and ultra-low crosstalk waveguide crossings based on a multimode interferometer for 840 nm operation," OSA Continuum, OSAC **3**, 334–344 (2020). 7. I. Goykhman, B. Desiatov, and U. Levy, "Ultrathin silicon nitride microring resonator for biophotonic applications at 970 nm wavelength," Appl. Phys. Lett. **97**, 081108 (2010). 8. J. Leuermann, A. Fernández-Gavela, A. Torres-Cubillo, et al., "Optimizing the Limit of Detection of Waveguide-Based Interferometric Biosensor Devices," Sensors **19**, 3671 (2019). 9. F. A. Kish, D. Welch, R. Nagarajan, et al., "Current Status of Large-Scale

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