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John Bigeon[a], Nolwenn Huby*[a], Jean-Luc Duvail[b]and Bruno Bêche[a]

[a]Institut de Physique de Rennes, University of Rennes 1, UMR CNRS 6251, Rennes, FRANCE
[b]Institut des Materiaux de Nantes, University of Nantes, UMR CNRS 6502, Nantes, FRANCE.
[*] Corresponding author, nolwenn.huby@univ-rennes1.fr

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In the field of nanophotonics, the understanding of optical phenomena related to sub-wavelength guiding in 1D-nanostructures is a fundamental interest for devices down-scaling. We present theoretical and experimental investigation of light propagation in original passive and active organic nanotubes. For this, polymer nanotubes has been designed and developed by the template wetting method. To characterize their optical behavior and in particular the sub-wavelength propagation, numerical and experimental tools have been developed. Modelling phenomena propagating in these nanofibers was performed by the numerical FDTD method. The effects of the geometry of these nanotubes and nanowires have been investigated. In particular, the effect of the diameter (outer and inner diameter for nanotubes) on the propagation behavior (energy distribution, losses), as well as the effect of the substrate, have been determined. Experimentally, two types of nanofibers were studied. First, direct injection into passive nanofibers of SU8 polymer was performed through a microlensed optical fiber. A striking result is the assessment of optical losses measured by the cut-back around 1.25 dB/mm for nanotubes of external and internal diameters respectively 240 nm and 120 nm. This appears very competitive compared to other systems currently envisaged for integratednanophotonics. Second, active polymer nanofibers (polyfluorene PFO) embedded in a waveguiding polymer were elaborated and appeared to be an efficient design for a nano-source.