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Pure Bending Loss in Nanowire Waveguides[1] JAEYEON PYO, JI TAE KIM, JEWON YOO, JUNG HO JE[2], Pohang University of Science and Technology — One of the major concerns in designing waveguides is unavoidable bending that causes energy loss due to the distortion of modal field. Bending loss in nanowire waveguides has been studied while including substrate coupling loss. Pure bending loss unaffected by substrate coupling in nanowire waveguides still remains unclear. A challenging task in study of pure bending loss is to introduce bending on nanowire waveguides in the air and to tune the radius of bending. We report the characterization of pure bending loss in nanowire waveguides by bending a vertical freestanding nanowire in the air. Specifically, vertical freestanding active nanowire waveguides of MEH-PPV have been fabricated by our meniscus-guided method. To characterize pure bending loss, desired bending was remotely introduced by applying electrostatic force near the top end of the waveguide. Finite-difference-time-domain simulation was performed to confirm the experimental result. We show that the bending losses, by conventional experimental approaches of nanowires rested on substrates, were strongly overestimated attributed to the coupling of the enhanced evanescent field to the substrate. We suggest that our system could be also utilized for studying various intrinsic properties of nanowire waveguides.

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