Efficient electro-optic modulation in low-loss graphene-plasmonic slot waveguides - DTU Orbit (26/04/2019)

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Surface plasmon polaritons enable light concentration within subwavelength regions, opening thereby new avenues for miniaturizing the device and strengthening light-matter interactions. Here we realize efficient electro-optic modulation in low-loss plasmonic waveguides with the aid of graphene, and the devices are fully integrated in the silicon-on-insulator platform. By advantageously exploiting low-loss plasmonic slot-waveguide modes, which weakly leak into a substrate while featuring strong fields within the two-layer-graphene covered slots in metals, we successfully achieve a tunability of 0.13 dB μm⁻¹ for our fabricated graphene-plasmonic waveguide devices with extremely low insertion loss, which outperforms previously reported graphene-plasmonic devices. Our results highlight the potential of graphene plasmonic leaky-mode hybrid waveguides to realize active ultra-compact devices for optoelectronic applications.

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