

# Optical nano-imaging of plasmons in semiconductor nanowire

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Recently, searching for better plasmonic materials has attracted much attention. Two major challenges of plasmonics are the confinement and propagation length of surface plasmons. Although, nobles metals, graphene and carbon nanotubes have been demonstrated to be appropriate medium for plasmons, they still have difficulty to simultaneously satisfy the two figures of merit. Here, we use infrared nanoimaging firstly demonstrate propagating surface plasmons in one-dimensional semiconductor nanowires at mid-infrared frequencies. The observed surface plasmons exhibit low-loss, high confinement and long propagation length. We show that the plasmon wavelength and damping can be governed by the nanowire size and the supporting substrates, enabling the development of active plasmonics and novel mid-infrared applications.