

Abstract

We discuss nano and Angstrom scale phenomena whereby light funnel through extreme aspect ratio slot antennas, enhancing terahertz molecular cross sections by thousands; lowering apparent transition temperatures of vanadium dioxide; inducing colossal tunneling-induced nonlinearities in Angstrom-scale van der Waals gaps; sub-10 nm photomasks for photolithography with 325 nm I-line. We manufacture millimeters-to-centimeter long, Angstrom- and nanometer-wide slits using photolithography, thin film-graphene deposition and selective etching-exfoliation; these nanometer and sub-nanometer gaps are essentially infinitely long for the purpose of any optical applications from ultraviolet to microwaves. Infinitely long Angstrom and nano gaps will find applications in lithography, nonlinear optics and molecular sensing.