

Abstract Submitted  
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**An Integrated Electrochromic Nanoplasmonic Optical Switch** ALEC TALIN, ERICH WALTER, NIST, AMIT AGRAWAL, Syracuse University, TING XU, HENRI LEZEC, NIST — We describe an electrochemically-driven optical switch based on absorption modulation of surface plasmon polaritons (SPPs) propagating in a metallic nanoslit array waveguides containing the electrochemical polymer polyaniline (PANi). Optical transmission modulation of near 100% is achieved by electrochemically switching PANi between oxidized and reduced states using voltages below 1 V. High spatial overlap and long interaction length between the SPP and the active material are achieved by preferential growth of PANi on the nanoslit sidewalls. The resulting orthogonalization between the directions of light propagation, and that of charge transport from the electrolyte to ultra-thin active material inside the nanoslit waveguide offers significant promise for the realization of electrochromic devices with record switching speeds.

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