335
Accession number:20123815452271
Title:Dispersionless slow light in MIM waveguide based on a plasmonic analogue of electromagnetically induced transparency
Authors:Wang, Guoxi (1); Lu, Hua (1); Liu, Xueming (1)
Author affiliation:(1) State Key Laboratory of Transient Optics and Photonics, Xi'An Institute of Optics and Precision Mechanics, Chinese Academy of Sciences, Xi'an 710119, China
Corresponding author:Liu, X.(liuxueming72@yahoo.com)
Source title:Optics Express
Abbreviated source title:Opt. Express
Volume:20
Issue:19
Issue date:September 10, 2012
Publication year:2012
Pages:20902-20907
Language:English
E-ISSN:10944087
Document type:Journal article (JA)
Publisher:Optical Society of America, 2010 Massachusetts Avenue NW, Washington, DC 20036-1023, United States
Abstract:We have proposed a metal-insulator-metal (MIM) waveguide system, which exhibits a significant slow-light effect, based on a plasmonic analogue of electromagnetically induced transparency (EIT). By appropriately adjusting the distance between the two stubs of a unit cell, a flat band corresponding to nearly constant group index over a broad bandwidth of 8.6 THz can be achieved. The analytical results show that the group velocity dispersion (GVD) parameter can reach zero and normalized delay-bandwidth product (NDBP) is more than 0.522. Finite-Difference Time-Domain (FDTD) simulations show that the incident pulse can be slowed down without distortion owing to the low dispersion. The proposed compact configuration can avoid the distortion of signal pulse, and thus may find potential applications in plasmonic slow-light systems, especially optical buffers. © 2012 Optical Society of America.
Number of references:32
Main heading:MIM devices
Controlled terms:Finite difference time domain method - Plasmons - Quantum optics - Waveguides
Uncontrolled terms:Analytical results - Broad bandwidths - Dispersionless - Electromagnetically induced transparency - Finite-difference time-domain simulation - Flat band - Group index - Incident pulse - Metal insulator metals - Optical buffer - Plasmonic - Potential applications - Signal pulse - Unit cells - Waveguide systems
Classification code:712.1 Semiconducting Materials - 714.2 Semiconductor Devices and Integrated Circuits - 714.3 Waveguides - 741.1 Light/Optics - 921 Mathematics
DOI:10.1364/OE.20.020902
Database:Compendex