Advanced fabrication of hyperbolic metamaterials

Hyperbolic metamaterials can provide unprecedented properties in accommodation of high-k (high wave vector) waves and enhancement of the optical density of states. To reach such performance the metamaterials have to be fabricated with as small imperfections as possible. Here we report on our advances in two approaches in fabrication of optical metamaterials. We deposit ultrathin ultrasmooth gold layers with the assistance of organic material (APTMS) adhesion layer. The technology supports the stacking of such layers in a multiperiod construction with alumina spacers between gold films, which is expected to exhibit hyperbolic properties in the visible range. As the second approach we apply the atomic layer deposition technique to arrange vertical alignment of layers or pillars of heavily doped ZnO or TiN, which enables us to produce hyperbolic metamaterials for the near- and mid-infrared ranges.

General information
State: Published
Organisations: Department of Photonics Engineering, Plasmonics and Metamaterials, DTU Danchip
Number of pages: 4
Publication date: 14 Sep 2017

Host publication information
Title of host publication: Proceedings of International Conference on Metamaterials and Nanophotonics, METANANO 2017
Volume: 1874
Publisher: American Institute of Physics Inc.
Article number: 020004
ISBN (Electronic): 9780735415546
DOI: 10.1063/1.4998025
Source: Scopus
Source-ID: 85030633939
Research output: Research - peer-review › Article in proceedings – Annual report year: 2017