2D semiconductor-metal quasi-periodic structures for photonics

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We report on fabrication of metal nanotubes in semiconductor nanotemplates possessing ordered two-dimensional hexagonal arrays of pores grown in semiconductor substrates using anodic etching in neutral electrolyte. Electrochemical pulsed deposition of arrays of Pt nanotubes with diameters of 70 and 140 nm is demonstrated. The electrochemical parameters were optimized for a uniform metal deposition on the inner surface of the pores. The produced metallo-semiconductor tubular structure behaves like a layered nanomaterial allowing one to easily cleave thin films consisting of rows of Pt nanotubes in semiconductor envelope. Taking into account the quasi-ordered spatial distribution of pores in semiconductor template, one can assume that the produced 2D metallo-semiconductor networks are promising also for specific photonic applications.

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