" WAVELENGTH-SELECTIVE PROPERTY OF 1D PHOTONIC CRYSTAL BASED ON POROUS SILICON MULTILAYER"

Bui Huy, Do Khanh Van, Pham Van Hoi, Pham Thanh Binh, Nguyen Thuy Van, Pham Duy Long, Do Hung Manh, Do Thuy Chi

TÓM TẮT:

We present the new results in wavelength-selective characteristics of 1D photonic crystal based on porous silicon multilayer designed as an optical interference filter. Those properties are studied in both experimentation and simulation. The porous silicon multilayer is fabricated by an electrochemical etching of a silicon wafer with timely repeat steps of applied current densities. This process makes samples have the configuration of a multilayer with periodic refractive indices that meets the condition of Bragg reflection (nd=/4). The simulation is relying on the Transfer Matrix Method (TMM) to design and predict the optical properties of 1D PS-multilayer as well as the relation between anodization parameters with reflection spectra. The obtained results show that the elaborated porous silicon multilayer has the wavelength-selective property in a controllable range of 1400 - 3000 nm, and reflectivity of about 90%. Suitability between spectral characteristics from those optical filters and simulations has been found