

The influence of the doping level of InP on the porous layer

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Recently, scientific interest is directed to the formation of nanostructures considered as a promising material for the creation of photon devices. The electrochemical process, which is unique due to its simplicity, low process temperature and low cost, stands out against different formation techniques of semiconductor nanostructures. The most well-known application of the electrochemical methods is the formation of a porous layer on the surface of semiconductor plate by anode etching. Rate of a chemical reaction essentially depends on the doping level of the semiconductor.

Results of the performed study confirm the assumption that the concentration of impurity charge carriers of the semiconductor plays fundamental role for the porous layer formation on the surface. It is shown that in order the electrochemical process of InP etching is accompanied by the active pore-formation, it is necessary to use crystals with sufficiently high doping level.

Biography

Suchikova Yana is the Senior Lecturer of the department of teaching physical and mathematical disciplines and information technology in education from Berdiansk State Pedagogical University. She has published more than 100 papers, of which are 20 articles, 3 monograph, 11 patents, abstracts and proceedings conferences. Her achievements include grant of the Cabinet of Ministers of Ukraine for young scientists; Victory in All-Ukrainian competition "Inventions - 2010" in absolute nomination "Best invention - 2010"; Diploma finalist Festival of Innovative projects "Sykorsky Challenge"; Winner of the prize of Leonid Kuchma's President Fund.

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Designing crystalline micro-structures at the polymer-CNT interphase via process control for composite fabrication

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Controlling the structural development in the interphase region during composite processing is significantly important for improving stress transfer between the polymer matrix and the nano-fillers. The formation of the polyacrylonitrile (PAN) interphase in the presence of the SWNT is studied as a function of processing conditions. By coupling both processing and crystallization, three distinct interfacial PAN coating morphologies are observed on SWNT and characterized using electron microscopy and X-ray diffraction. In the semi-dilute polymer concentration regime subjected to shearing, PAN extended-chain tubular coatings are formed on SWNT. Dilute PAN/SWNT quiescent solutions subjected to cooling yields hybrid periodic shish-kebab structures (first observation for PAN polymer); and dilute PAN/SWNT quiescent solutions subjected to rapid cooling results in the formation of an irregular PAN crystalline coating on the SWNT. The synergistic effect between shear-flow in polymer solution and SWNT was also found in poly(vinyl alcohol) (PVA)/SWNT systems to induce interfacial tubular coating with extended-chain crystalline structure. In addition, these highly crystalline tubular coating structures of PAN and PVA have been successfully grown in the macroscopic composite systems by incorporating specific crystallization procedures into material processing steps.

Biography

Yiyng Zhang is a Ph.D. candidate in Department of Mechanical and Industrial Engineering at Northeastern University and a graduate research assistant in MINUS (Macromolecular Innovations in Nanomaterial Utilizing Systems) Laboratory. To date, she has published four papers in peer-reviewed journals, and presented five conference papers and posters.

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