

SYNTHESIS AND CHARACTERIZATION OF SILICON NANOPARTICLES PRODUCED BY LASER ABLATION

ABSTRACT

The aim of this thesis is the composition of silicon nanoparticles by laser ablation method in a wet environment and then the study and analysis of their characteristics with the characterization methods. Specifically, in the present work were generated nanoparticles p-type and n-type silicon in solutions of acetone and ethanol, which were irradiated with two laser systems, one of which has a pulse duration of femtosecond and the other the nanosecond. In general the composition of silicon nanoparticles experimentally confirmed the large influence of the parameters of the laser radiation (energy of beam, duration of pulse, duration of irradiation) but also the wet environment (solvent) in the characteristics of the produced nanoparticles. Then, the chemical composition of the nanoparticles was tested by Photoelectron Spectroscopy X-ray (XPS). Due to the morphology and the characteristics of silicon nanoparticles generated emission in the spectral region of blue. For this reason, the optical properties of the nanoparticles were determined from the emission spectrum by photoluminescence spectroscopy and finally determined the number and size of the particles formed by the dynamic scattering light method.