Contribution ID: **165** Type: **Oral**

Laser reduction of Graphene Oxide films on SiO2-Si structures

Thursday 6 November 2025 10:00 (15 minutes)

To form CMOS compatible graphene device the graphene oxide reduced by CW laser (455 nm) on SiO2/Si wafer was used. The graphene oxide water solution was deposited on SiO2/Si structure by drop casting method with following heating at 50℃ for 1 hour. For reduction of the GrO film the laser power from 0.100 W to 0.800 W was employed, as in air and in nitrogen atmosphere. The part of samples was treated in air with additional heating at 100C. For scribing of the GrO film on SiO2 the power more than in factor 10 was used.
Analysis of electrical properties, surface morphology and structure of the laser reduced strips and comparison with thermal annealing in air at 25 It0C for 15 minutes using correspondingly I-V characteristics, Hall effect measurements, SEM and AFM techniques and Raman spectroscopy were performed.
Raman spectra demonstrated that the laser reduction allows us to obtain graphene structure considerably better than with thermal annealing at 250C for 15 min. It is worthy noted, that relation of ID/IG lines, which determines defectivity of the material, is minimal for 0.150 W light power in case of treated at air with additional heating, for 0.550 W in case of treatment in air without heating and for about 1 W in case of treatment in nitrogen atmosphere without heating. Nature of this phenomenon is discussed and other electrical and structural characteristics obtained in the optimal regimes of the laser treatment are presented.

Type of presence

Presence at Taras Shevchenko National University

Authors: Prof. NAZAROV, Alexei N. (Lashkaryov Institute of Semicnductor Physics NAS of Ukraine); Dr NIKOLENKO, Andrii (Lashkaryov Institute of Semicnductor Physics NAS of Ukraine); Dr TYAGULSKYY, Igor (Lashkaryov Institute of Semicnductor Physics NAS of Ukraine); Mr NAKONECHNYY, Illya (National Technical University "Igor Sikorsky KPI", Kyiv, Ukraine); Dr SLOBODIAN, Oleksandr (Lashkaryov Institute of Semicnductor Physics NAS of Ukraine); Dr LYTVYN, Petro (Lashkaryov Institute of Semicnductor Physics NAS of Ukraine); Dr TYAGULSKIY, Stanislav (Institute of Photonics and Electronics CAS, Praha, Czech Republic); Prof. STRELCHUK, Viktor (Lashkaryov Institute of Semicnductor Physics NAS of Ukraine); Prof. DZHAGAN, Volodymyr (Lashkaryov Institute of Semicnductor Physics NAS of Ukraine)

Presenter: Prof. NAZAROV, Alexei N. (Lashkaryov Institute of Semicnductor Physics NAS of Ukraine)

Session Classification: Workshop on Laser processing of materials for advanced optoelectronic applications

Track Classification: Laser processing of materials for advanced optoelectronic applications