БЪЛГАРСКА АКАДЕМИЯ НА НАУКИТЕ

ИНСТИТУТ ПО ФИЗИКОХИМИЯ

СТРАНСКИ-КАИШЕВ КОЛОКВИУМ
по
ФАЗООБРАЗУВАНЕ и КРИСТАЛЕН РАСТЕЖ

На 17 Септември 2019 (вторник) от 10:30 ч. в зала „БОЛЦМАН“ на ИФХ, блок 11, етаж 4, кампус на БАН (4 км.) ще бъде изнесена лекцията:

Thick Hydride Vapor Phase Heteroepitaxy: a Novel Approach to Growth of Nonlinear Optical Materials

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Абстракт: At the time when many nonlinear optical (NLO) materials for frequency conversion of laser sources in the mid and long-wave infrared have achieved their fundamental or technological limits, we propose heteroepitaxy as a solution to develop novel NLO materials. Heteroepitaxy, is the most applied method to combine two different materials – by growing one material on another. In this work we show that combining two binary materials in a ternary may significantly improve the NLO properties that are of great importance for the pursued applications. Plus, due to the closer lattice match to the related substrate, a ternary is always a more favorable heteroepitaxial case than the two completely different materials. We also discuss combining different growth methods – one close-to-equilibrium (e.g. HVPE) with one far-from-equilibrium (MOCVD or MBE) growth processes – to explore new opportunities for growth of novel heterostructures, including ternary layers with gradual change in composition. The combination of different materials by nature – organics with inorganics – in a hybrid quasi-phase matching (QPM) structure is another topic we briefly discuss, along with some innovative techniques for fabrication of orientation-patterned (OP) templates. Still, the focus in this work is on a series of NLO materials – GaAs, GaP, ZnSe, GaSe, ZnTe, GaN… and some of their ternaries grown with high surface and crystalline quality on non-native substrates and on non-native OP templates using hydride vapor phase epitaxy. The grown thick device quality QPM structures were used for further development of high power, compact, broadly tunable frequency conversion laser sources.