LATERALHETEROSTRUCTURES WITH ARBITRARY SHAPE AND MATERIAL COMPOSITION IN TWO-DIMENSIONALMATERIALS

Hossein Taghinejad and Ali Adibi
School of Electrical and Computer Engineering,
Georgia Institute of Technology
ali.adibi@gatech.edu

A new approach for realization of lateral heterostructure with a high degree of control over the shape of the heterostructure and the material composition in two-dimensional transition metal chalcogenides is presented. It is shown that through highly controlled chalcogen exchange, sub-micron-sized lateral heterostructures with unprecedented flexibility in shape and material composition wih dimensions below 50 nm can be formed. Fabrication processes both at low temperatures and high temperatures will be explained, and their unique features will be discussed using detailed experimental characterization results. Potential use of these structures in forming quantum devices in atomically thin materials will also be discussed.

Biography

Ali Adibi is the director of Bio and Environmental Sensing Technologies (BEST) and a professor and Joseph M. Pettit chair in the School of Electrical and Computer Engineering, Georgia Institute of Technology. His research group has pioneered several structures in the field of integrated nanophotonics for both information processing and sensing. He is the author of more than 220 journal papers and 520 conference papers. He is the editor-in-chief of the Journal of Nanophotonics, and the nanophotonic program track chair of the Photonics West meeting. He is the recipient of several awards including Presidential Early Career Award for Scientists and Engineers, Packard Fellowship, NSF CAREER Award, and the SPIE Technology Achievement Award. He is also a fellow of OSA, SPIE, and AAAS.