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Prospects for engineering semiconductor nanowire materials for optoelectronics

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Although compound semiconductor nanowires offer unprecended flexibility in materials design, we show how current approaches to materials synthesis are only just beginning to control their defect structure. We show how point defects are intimately connected to luminescent response, while carrier transport sensitively reflects surface states. However, we provide examples highlighting how with appropriate heterostructured growth and processing, one can achieve engineered nanowires with exceptional and tunable optical properties. Indeed, we also show how a simular approach can be used to control carrier transport. As an example, we show how random telegraph spectroscopy transport enabled us to develop electrometers with an ability to discriminate charge with world record sensitivity.

Biography

Harry Ruda is Director of the Centre for Advanced Nanotechnology, the Stanley Meek Chair in Nanotechnology, and Professor of Applied Science and Engineering at the University of Toronto. He is one of the founders of a Canadian National Centre of Excellence in Photonics. He serves on the National Science and Engineering Council of Canada and on other government panels including those of the DOE, EPA and NSF in the US, and the RAE and EPSRC in the UK. He also serves on the editorial boards of: Journal of Applied Physics, Applied Physics Letters, Journal of Nanoscience and Nanotechnology, Journal of Materials Science: Materials in Electronics, and the Nanotechnology Research Letters. He is a Fellow of the Royal Society of Canada.

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