

平成 27 年 11 月 5 日
応用物理学会北海道支部
会員各位

応用物理学会北海道支部講演会のお知らせ

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演題：III-V nanowires for optoelectronic applications

講師：H.H. Tan 氏

(Professor, Department of Electronic Materials Engineering Research School of
Physics and Engineering The Australian National University)

日時：平成 27 年 11 月 16 日（月） 13:30～14:30

場所：北海道大学 量子集積エレクトロニクス研究センター3 階セミナー室

共催：応用物理学会北海道支部（共催団体：量子集積エレクトロニクス研究センター）

講演の要旨

The excitement of nanowire research is due to the unique electronic and optical properties of these nanostructures. Both axial and radial heterostructure nanowires have been proposed as nano-building blocks for the next generation devices, which are expected to revolutionise our technological world. The unique properties stem from their large surface area-to-volume ratio, very high aspect ratio, and carrier and photon confinement in two dimensions. These nanowires are usually grown by the so-called vapor-liquid-solid mechanism, which relies on a metal nanoparticle to catalyze and seed the growth. An alternative technique to grow the nanowires is by selective area growth technique, where a dielectric mask is first patterned on the substrate prior to growth.

In this talk, I will present an overview of compound semiconductor nanowire research activities at The Australian National University. The optical and structural properties of binary and ternary III-V nanowires including GaAs, InGaAs, InP and GaAsSb nanowires grown by metalorganic vapour phase epitaxy will be presented. Various issues such as tapering of the nanowires, compositional non-uniformity along nanowires, crystal

structure, carrier lifetime and polarization effect will be discussed. I will also present our results of III-V nanowires grown on Si substrate which are of great interests for the integration of nano-optoelectronic devices on Si platforms. Our results of enhancing the quantum efficiency of nanowires by using plasmonics are promising to improve the performance of nanowire devices. Finally, the results from our nanowire lasers, solar cells and photodetectors will be presented.

世話人 富岡克広

北海道大学大学院情報科学研究科

電話 : 011-706-7189 tomioka@rciqe.hokudai.ac.jp