Photonics and applications with semiconductor nanowires

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Abstract

Semiconductor nanowires are filamentary crystals with a tailored diameter in the range between few and ~100 nm. Thanks to their special shape and size they have shown to exhibit extremely special properties, including anisotropic light absorption and emission, and resonant absorption phenomena depending on the nanowire diameter and position with respect to the excitation source [1-4].
In this talk I will start reviewing what optical properties of nanowires render them ideal building blocks for next generation solar cells [4,5]. I will then show how these properties can also be suppressed or modified by associating the nanowires with tailored metallic nanostructures [6,7]. Finally, I will show how NW systems can certainly bring progress to the use of nanowires for next generation solar cells and proposed a new concept for a spectral-splitted and multi-junction solar cells [8].

References

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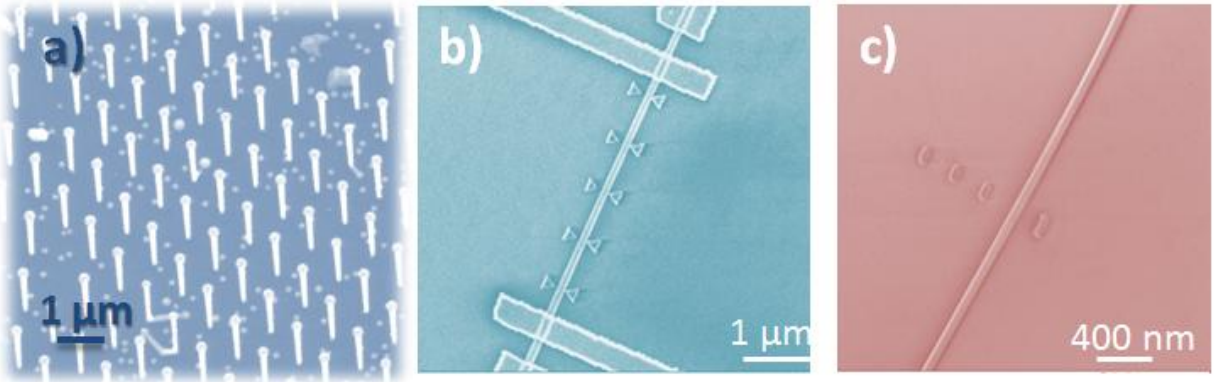
Figures



Scanning electron micrographs of a) an array of GaAs nanowires; a nanowire device with embedded bow-tie antennae (b) and a Yagi-Uda antenna (c).