**High-Performance Flexible Electronics and Optoelectronics Based on Nanomaterials**

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Due to the advent of nanotechnology, materials can be readily fabricated into nanoscale configurations with different dimensionalities and widely tunable properties for technological applications. In this presentation, we would summarize and discuss the recent progress in our research group, emphasizing the development of various one-dimensional and two-dimensional semiconductors for high-performance flexible electronics and optoelectronics [1-3]. For example, recently, we fabricate highly-dense and crystalline InxGa1-xSb nanowires on amorphous substrates with enhanced chemical vapor deposition. The obtained nanowires display superior electrical and optoelectronic properties, such as the high hole mobility and broadband ultra-fast photoresponse over the visible and infrared optical communication region. The mechanically flexible nanowire device can yield efficient response times down to microseconds along with the high responsivity of 6000 AW-1 and excellent external quantum efficiency of 4.8×106 % towards 1550 nm regime. Importantly, large-scale nanowire parallel arrayed devices can also be configured to illustrate their practical device integrability for industrial applications.

**References:**

[1] Dong D., Lan C., Li F., Yip S.P., Ho J.C. "Incorporating Mixed Cations in Quasi-2D Perovskites for High-Performance and Flexible Photodetectors", *Nanoscale Horizons*, **4**, 1342-1352, 2019.

[2] Li D., Lan C., Manikandan A., Yip S.P., Zhou Z., Liang X., Shu L., Chueh Y.L., Han N., Ho JC. "Ultra-Fast Photodetectors based on High-Mobility Indium Gallium Antimonide Nanowires", *Nature Communications*, **10**, 1664, 2019.

[3] Lan C., Zhou Z., Wei R., Ho J.C. "Two-Dimensional Perovskite Materials: from Synthesis to Energy-Related Applications", *Materials Today Energy*, **11**, 61-82, 2019.

**Short Biography – Albert Einstein**

Dr. Johnny C. Ho received his B.S. degree with high honors in Chemical Engineering, and M.S. and Ph.D. degrees in Materials Science and Engineering from the University of California, Berkeley, in 2002, 2005 and 2009, respectively. From 2009 to 2010, he worked as a post-doctoral researcher in the Nanoscale Synthesis and Characterization group (Materials Science Division) at Lawrence Livermore National Laboratory, California. At present, he is the Associate Head and Associate Professor (with tenure) in the department of Materials Science and Engineering at City University of Hong Kong. Over the years, he has won a number of awards, including President’s Awards & Outstanding Research Awards for Junior Faculty, City University of Hong Kong, World Cultural Council (WCC) Special Recognitions Awards, and recently elected to be a Founding Member in the Young Academy of Sciences of Hong Kong, *etc*. His current research interests focus on the synthesis, characterization, integration and device applications of nanoscale materials for various technological utilizations, including electronic, sensor and energy harvesting devices (<https://HoCityU.com>). He has published over 160 journal articles and 7 book chapters with a H-index of 45 (>8900 citations).

