

Jan 23, 2014

Transferrable Single-Crystalline Semiconductor Nanomembranes and Their Versatile Applications



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Abstract: Rigid semiconductor-based integrated circuit chips have changed our life for many decades. While they offer superior performance with high packing density, the rigidity of these chips often makes them hard to be implemented in many applications, such as very large-area, conformal, easy-to-bend and space-limited systems, and particularly bio-implantation systems. Single-crystalline semiconductor nanomembranes that are released from various semiconductors are mechanically bendable, stackable, strainable, transferrable and conformal to any flexible and rigid substrates, with equivalent electronic properties as their bulk counterparts. These unique properties of semiconductor nanomembranes provide us with the unprecedented opportunities to develop new types of electronic, optoelectronic and photonic devices. In this talk, I will present examples of such devices to show the unique capabilities of semiconductor nanomembranes.

Biography: Zhenqiang Ma received the Ph.D. degree in electrical engineering from University of Michigan in 2001. He worked for Conexant Systems and Jazz Semiconductor before he joined the faculty of University of Wisconsin–Madison in 2002. He is now a Vilas Distinguished Achievement Professor and Lynn H. Matthias Professor in the Department of Electrical and Computer Engineering with affiliated appointments in Nuclear Engineering, Engineering Physics, Materials Science Program and UW Energy Institute. His research interest covers semiconductor materials and heterogeneous integration, device physics and technologies, and their applications to electronics, optoelectronics, nanophotonics, energy conversion, bioelectronics, biomimetics, power electronics and sensors for nuclear materials. He has published over 300 peer-reviewed technical papers related to his research. He received the *PECASE*, DARPA Young Faculty Award in 2008 and several awards from University of Wisconsin. He holds and has licensed over a dozen of US patents and co-funded a company.