

Unipolar rectifying silicon nanowires

TCAD study

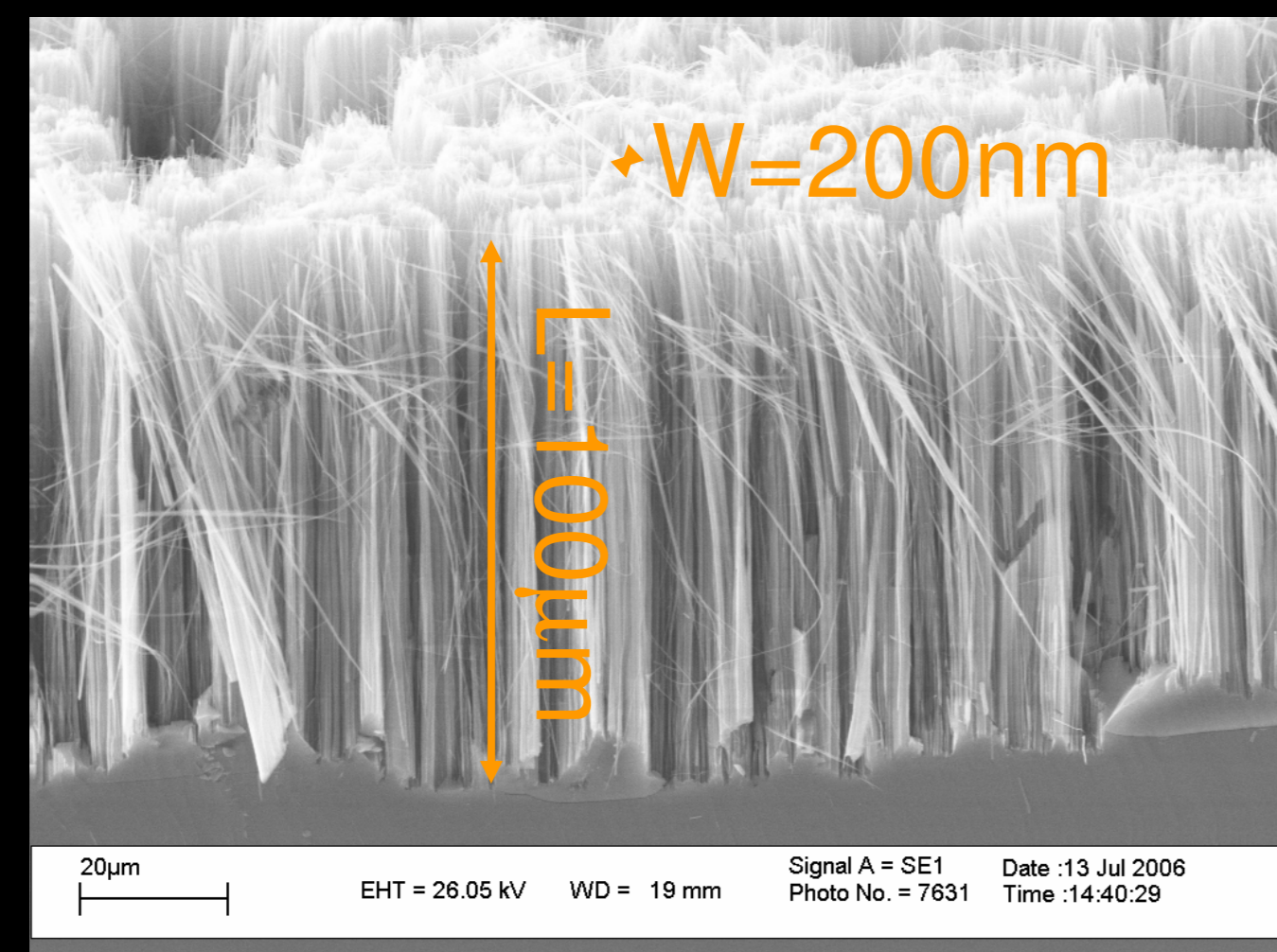


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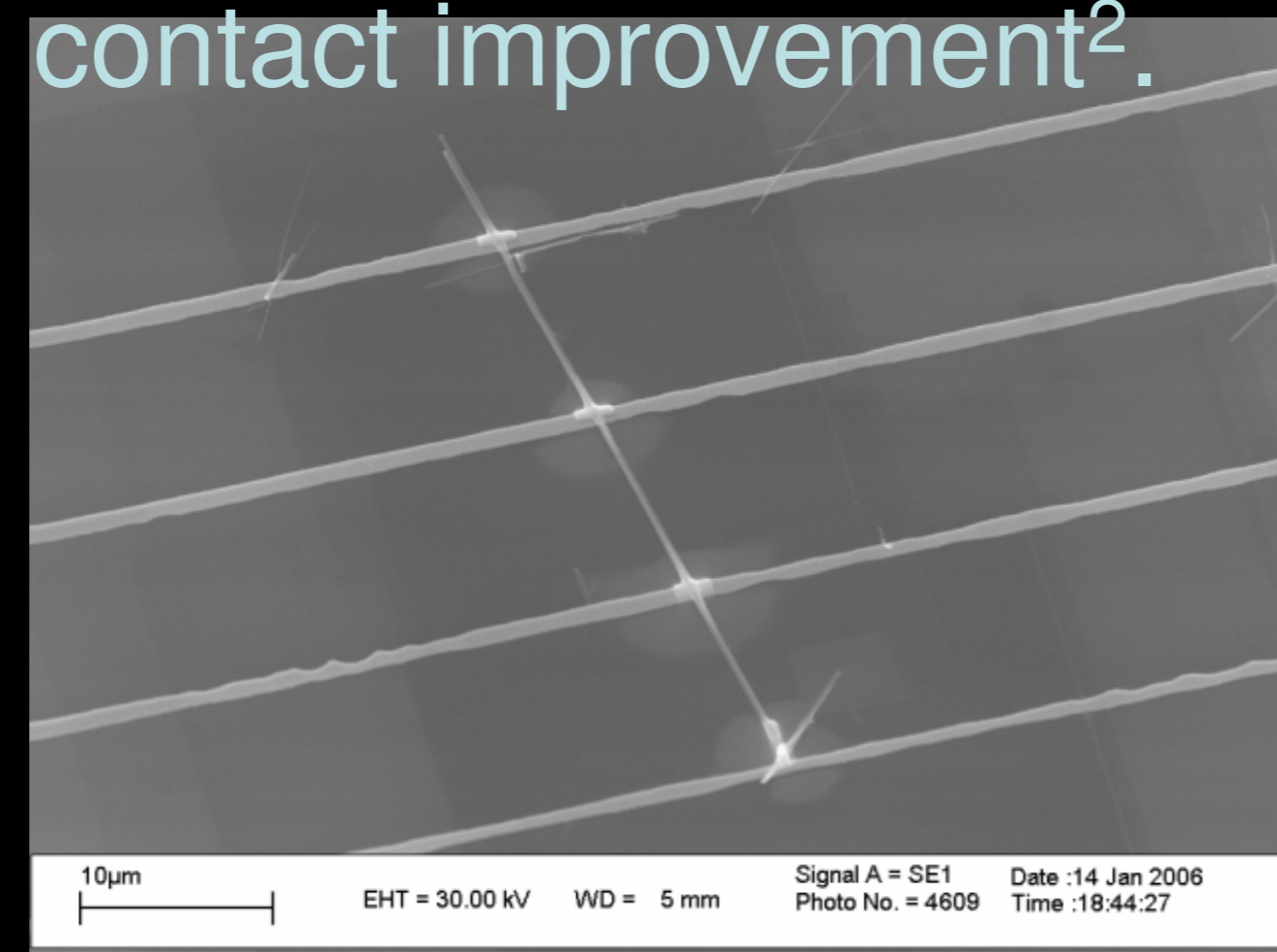
Abstract

The contact overlap along the length of a NW will result in rectifying behaviour that is dependent on the overlap length. This feature can be used as a sensor.

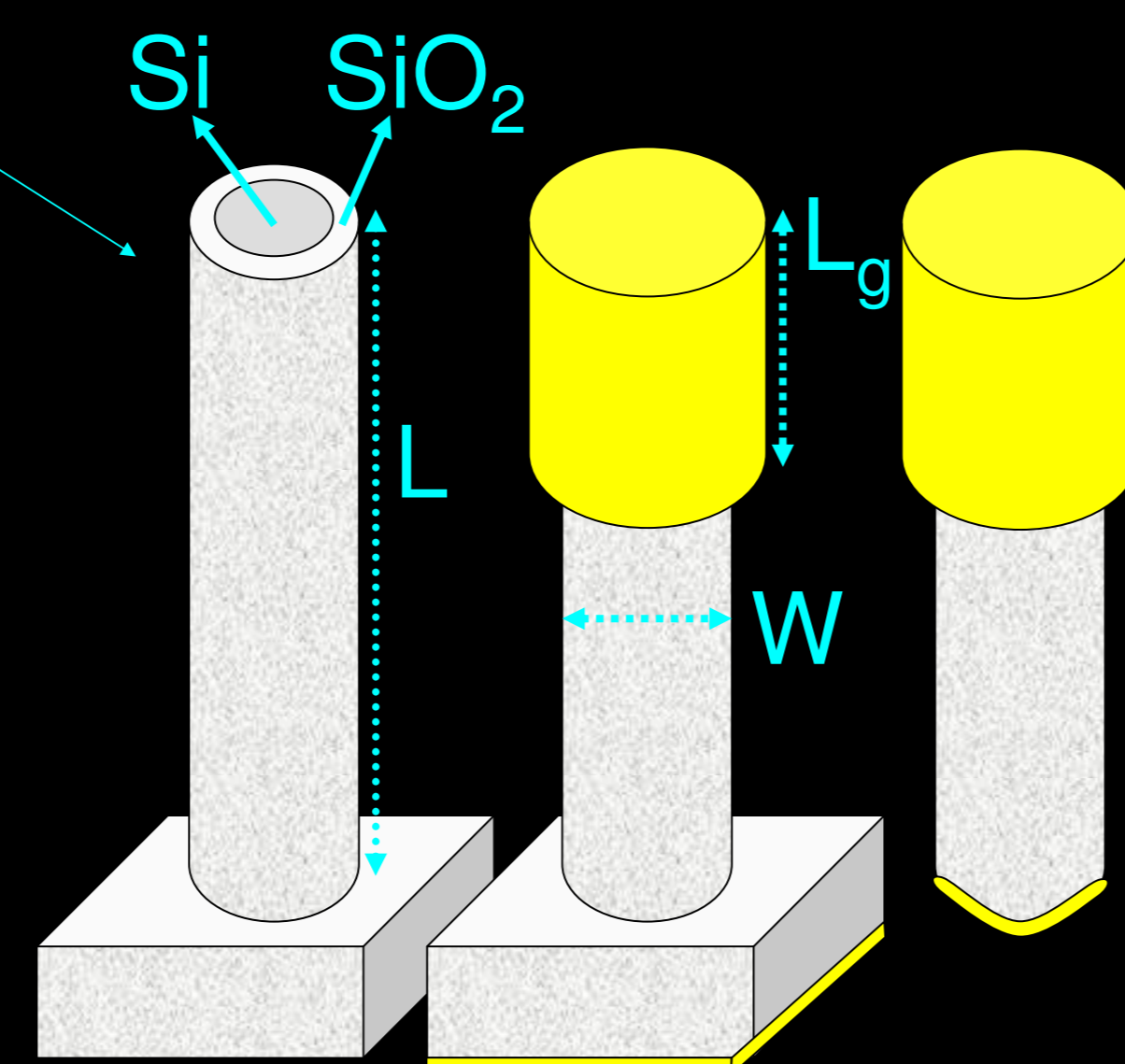
Experiments



4-point probe measurement: pre-defined micro contacts with FIB contact improvement².

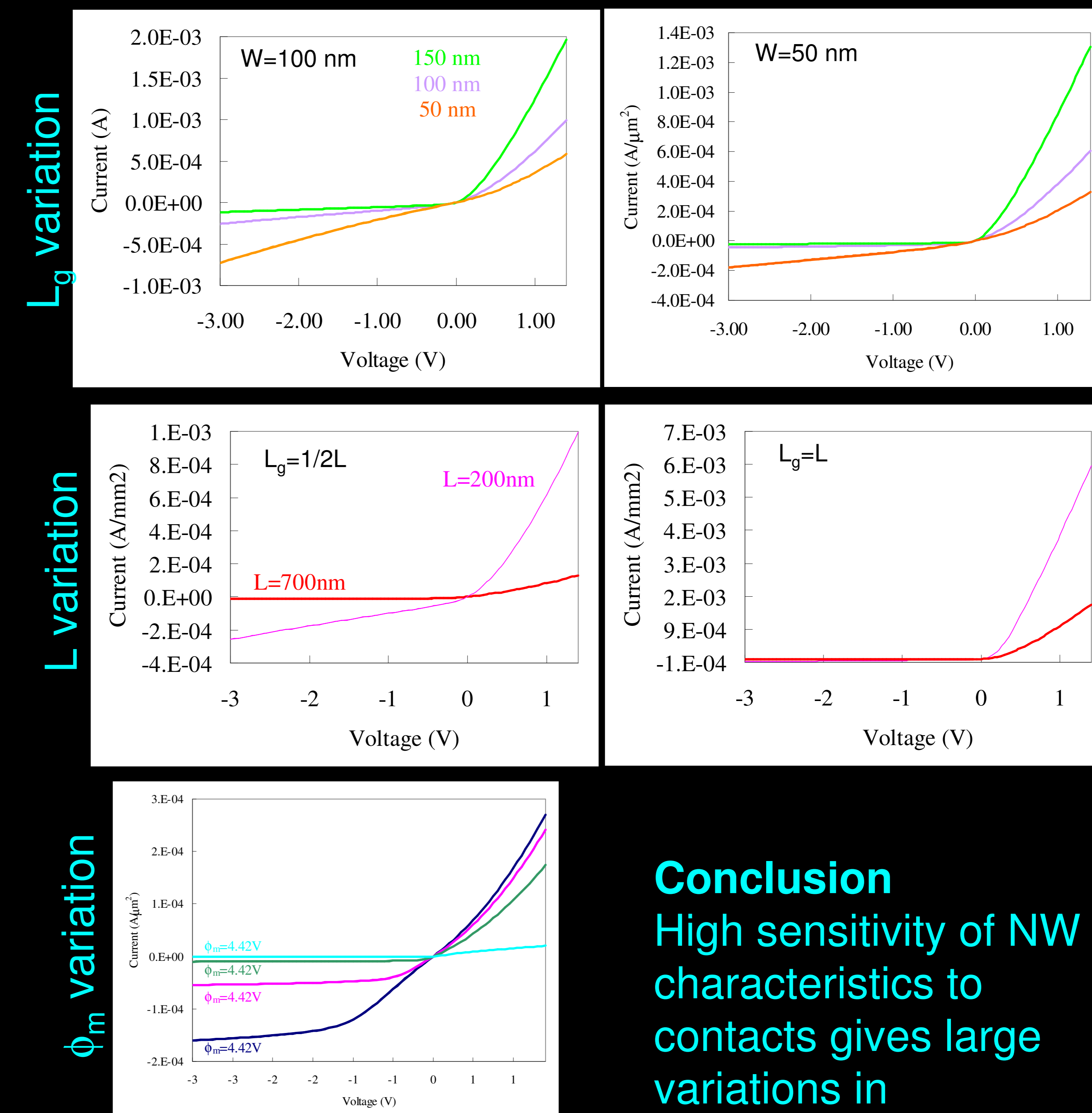


Top down method for wire fabrication: metal-induced excessive local oxidation and dissolution of the Si underneath the metal in an aqueous fluoride solution¹.



Schematic contacting of NWs.

2D TCAD



Conclusion
High sensitivity of NW characteristics to contacts gives large variations in characteristics

¹Improved method based on K. Peng, et al., Advanced Functional Materials, 16, 387-394 (2006)
²FIB by Dr. M. Larsson (IC)