Operation conditions of bistable nanoelectromechanical switches

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Due to their nanoscale effects, nanoelectromechanical (NEM) devices have demonstrated unique properties that differ greatly from the ones of microelectromechanical systems (MEMS) [1]. Owing to robust chemical and physical structure and reproducibility, single crystalline Ge nanowires are great candidates for NEM devices [2].

Here we present two-input gateless AC-DC controlled NEM switches based on an individual single-clamped Ge nanowire. The operation conditions of the switches were investigated by *in-situ* SEM technique. Developed and improved nanowire pull-out mechanism controlled by combined AC-DC field is discussed [2].

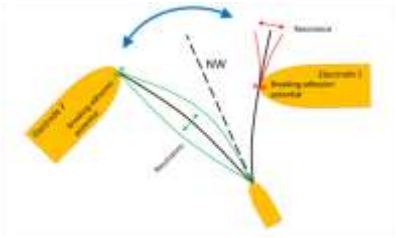

Fig.1 Schematics of AC-DC controlled two input bistable switch

We also present an investigation of contact properties of a germanium (Ge) nanowire based NEM switch in its ON state. By determining the shift of resonance frequency of the Ge nanowire in the ON state, the contact stiffness was evaluated. It is a simple way to indicate the nanowire/counter electrode contact strengthening without disassembling the contact [3].

References

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