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Nanometrology using nano-gap probe

- Mapping electrical resistance of nanomaterials -

Motivation

We are developing nano-tools for nanometrology. Multi-probe systems on scanning probe microscopy (SPM) have been developed for electrical property measurement of nanomaterials, such as semiconductor nano-wire, few-layer graphene and nanocarbons.

Originality

Pt electrode split by nanogap (<50 nm) was integrated on a Si cantilever for SPM. In-plain resistance (conductance) of nanomaterials can be measured without any lithographic processes. A conductance image of few-layer graphene on SiC was successfully obtained for the first time.

Impact

Nanotools based on SPM technology will be powerful tools for development of nanomaterials. Various types of the nanotools will be realized in the near future. Next-generation materials for future electron devices will be discovered employing the nanotools.

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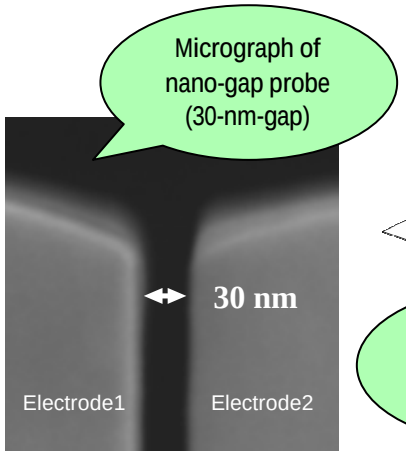
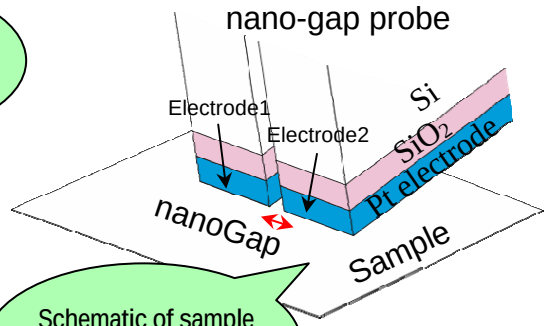
Imaging of conductivity of few-layer graphene using nano-gap probe





※Integrated nanogap probe with 30-nm-gap was successfully fabricated.

※Conductance image of monolayer graphite (graphene) is successfully obtained for the first time.