Contacting ZnO nanowires with platinum paths

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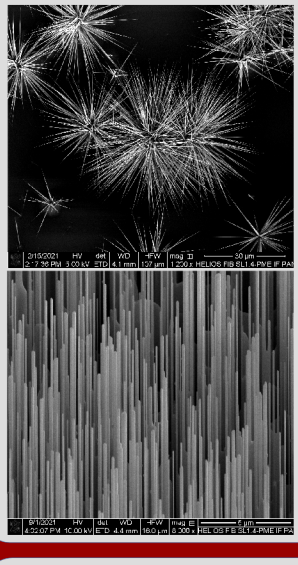
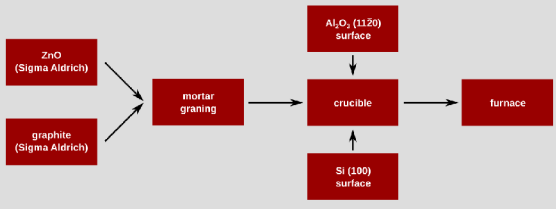
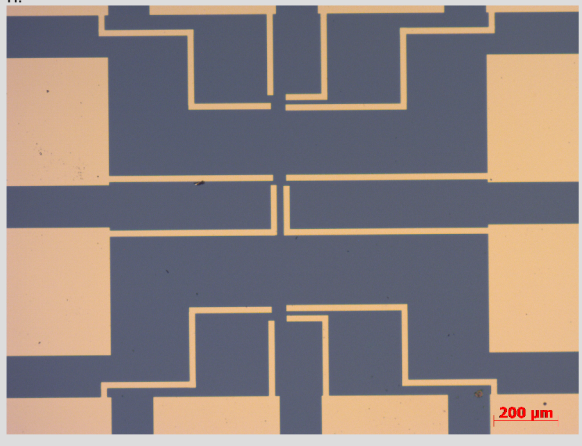


ZnO nanowires (NWs) have numerous physical advantages over other compounds like high exciton binding energy (60 meV), large piezoelectricity, low cost production and wide direct band gap (3.37 eV). In order to study their electrical properties *in-situ*, it is necessary to contact them with a measuring system in a micro scale, e.g. using a FIB microscope.

On the left one can observe ZnO NWs grown on Si (upper image) and on sapphire (lower image) substrate in carbothermal process (below).



The image of electric chip made with electron beam lithography technique. A silicon substrate (100) had been coated with insulating SiO_2 (300 nm). The paths were made of Au (100 nm) adhesively deposited on 10 nm of Ti.



NWs preparation

Mechanical scraping of NWs from the substrate using a Mo TEM grid coated with holey carbon film.

NW selection

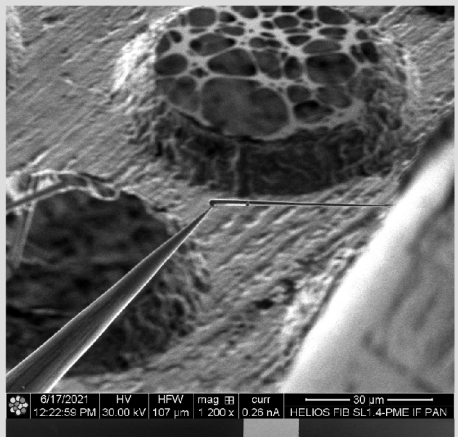
The NW must follow the criteria:
- one tip hanging over the grid
- not touching the other NWs.

NW transfer

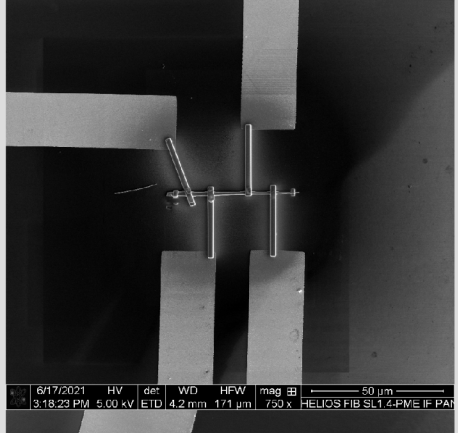
Transferring the selected NW onto electric chip using Omniprobe.

Contacting NW

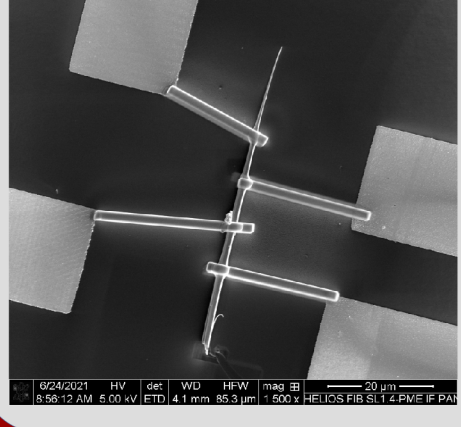
Extending the paths obtained by litography to NW. Contacting NWs with Pt paths using electron or ion beam.



The process of transferring NW ZnO from a Mo grid. The NW is attached to the Omniprobe, in the background there are holes of the grid covered with a carbon film.



ZnO NW contacted to the electric chip. Platinum FIB paths deposited using an **ion beam**. The advantage of this solution is that the chip surface is cleaned with gallium ions just before the path deposition. However, some of the Ga ions are implemented.



ZnO NW contacted to the electric chip. Platinum FIB paths deposited using an **electron beam** allows to obtain chemically cleaner paths. On the other side, the chip surface needs to be cleaned very carefully before the process.

This work has been supported by the National Science Centre Poland, through project No: 2019/35/B/ST5/03434 and by the Foundation for Polish Science through the IRA Programme co-financed by EU within SG OP.