Nanolithography activity in the group:

BG group and AKR group has extensive activities in the area of nanolithography. The work is done in a Clean room of the centre which has been established with support from the Nanomission Projects. The clean room is class 10,000 class room which is maintained at class 1000 in specific areas.

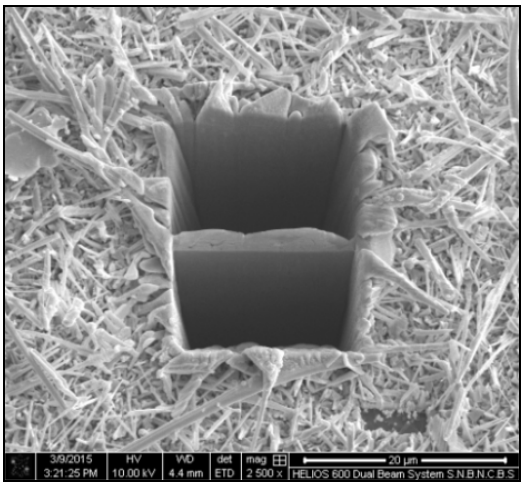
The facilities in the clean room allow optical lithography, electron beam lithography (EBL) and focused ion beam (FIB) lithography.

Visit of the Honourable Union Minister for Science and Technology and Earth Science to the Bose Centre Clean room on 3rd May, 2015 (Standing in front of Helios machine, 2nd from left)

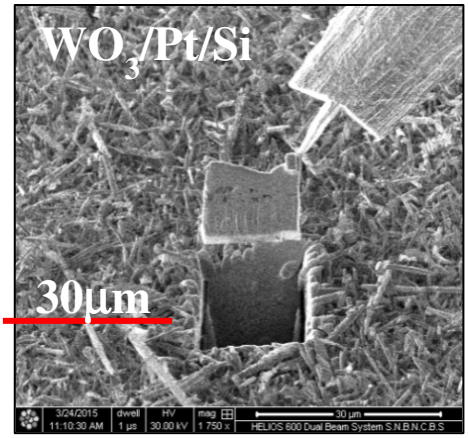
One of the activities that is carried out on a routine basis is to integrate sub- 100nm nanowire of any material produced by bottom-up approach like chemical route or physical/chemical vapour deposition to a single nanowire device connected to 2 or 4 probes.

Integrating the rich materials base of bottom-up approach with nano-lithograhic process is regularly done . For attaching nanowires to prefabricated contact pads for opt-electronic or electronic measurements in addition to EBL –lift off, FIB or Focused electron beam deposited metals (Pt or W) are also used.

The group has done extensive work in the area of interface physics. Cross-sectional lamella using ion-beam lithographic technique is done on regular basis.



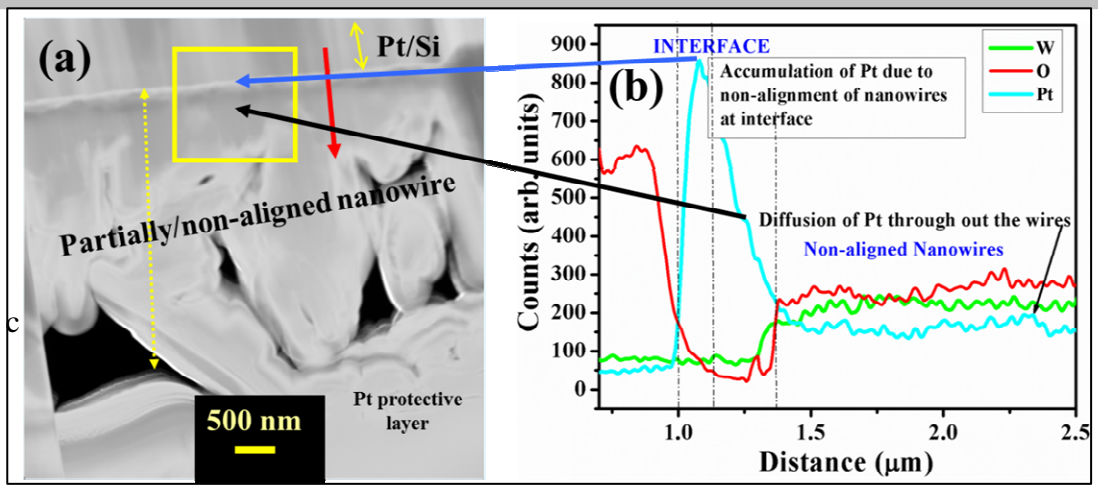
TEM Lamella preparation of a nanowire grown on substrate using Ion-beam lithography

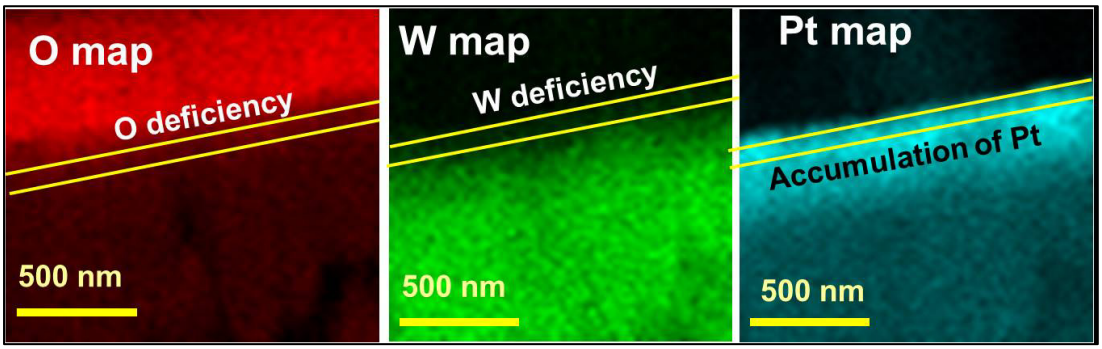


Omni probe lifting off the sample

Interface analysis of X-TEM Specimen:

Partially/non aligned NWs- Interface cross section





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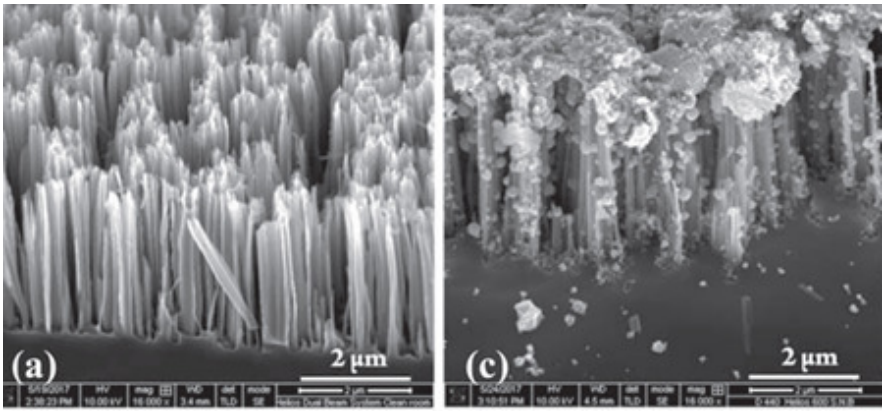
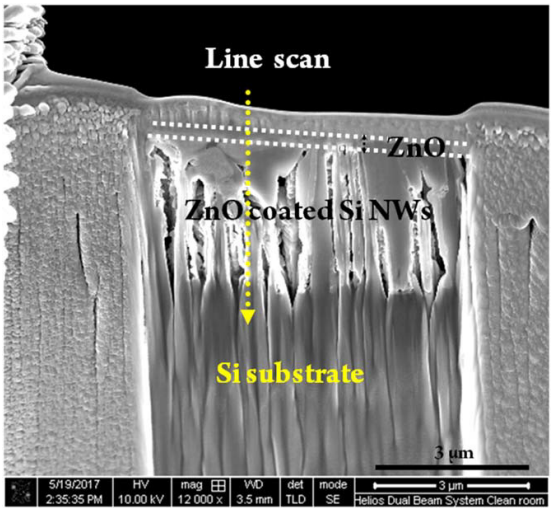
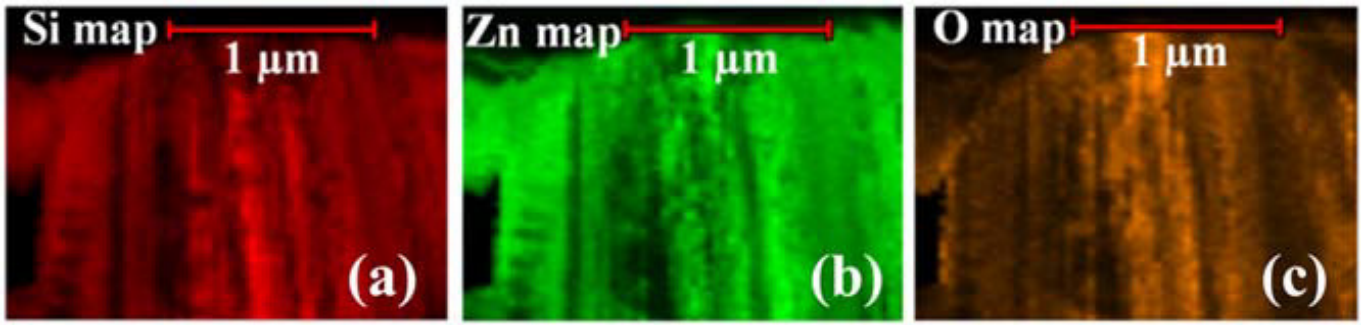


Si nanowire/ZnO hetero junction

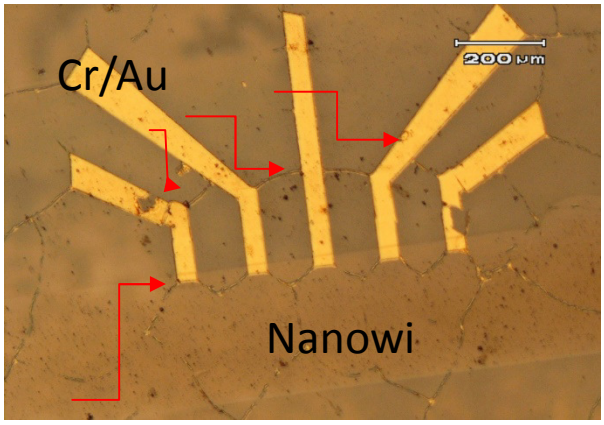
Interface analysis using ion beam lithography technique

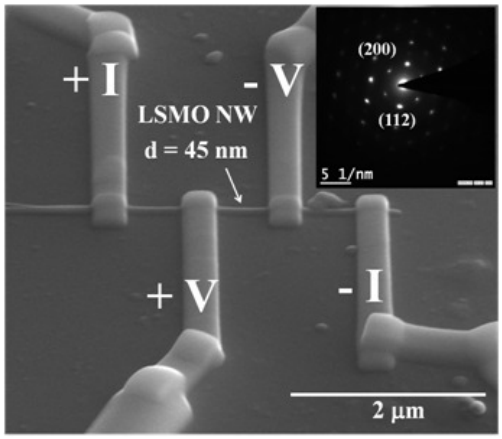




Chandan Samanta, Ankita Ghatak , A K Raychaudhuri and Barnali Ghosh, Nanotechnology 30 , 305501, 2019

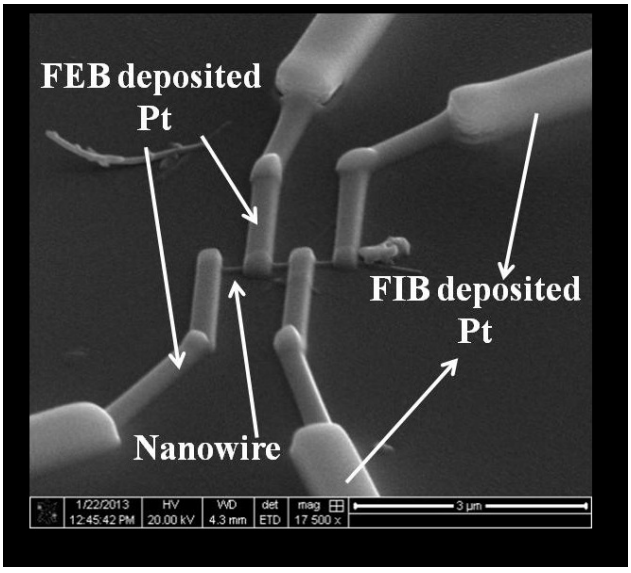
Optical and e-beam lithography for electrical connection in single nanowire:



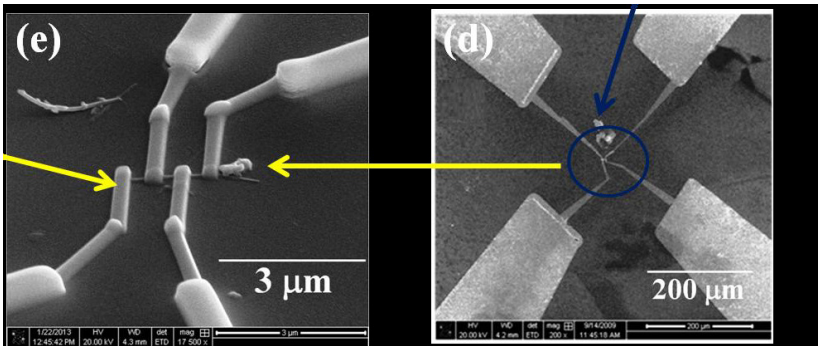


Electrical four wire contact made using e-beam lithography on a single nanowire of diameter 45nm.

Subarna Dutta, Barnali Ghosh, A.K.Raychaudhuri et.al. Appl. Phys. Letts. ***105****,073117 (2014)*



Single Nanowire connected using FIB deposited Pt



Combined photo and e-beam lithography for electrical connection on a single nanowire