



Silicene Growth On NaCl Insulating Thin Films

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Silicene the silicon based analog of graphene has a 2D structure that could have some attractive electronic properties: massless Dirac fermions, high electron mobility... It is a particularly promising material for nanotechnology because it can be integrated into industry-based silicon electronics. The existence of silicene has been achieved recently by epitaxial growth of silicon on the noble metal substrate Ag and Au. However, the electronic interaction between silicene and the metallic substrates is strong and could mask its electronic properties.

In order to access the intrinsic properties of silicene we plan to grow silicene on an insulating material such as NaCl.

We have grown thin film of NaCl (1 ML) on Ag(110) surface. The STM images show that NaCl film presents a large and defect free area and presents a (4x1) superstructure. The Theoretical calculations (DFT) of NaCl on Ag(110) substrate support the experimental observations already found.

Deposition of silicon atoms on NaCl induces a (4x3) superstructure and the STM images show that silicon forms a silicene sheet with a honeycomb like structure.

In order to get access to the silicene electronic structure, experiments using Synchrotron facilities at SOLEIL such as EXAFS and ARPES techniques are programmed in LUCIA and TEMPO beam-lines.

Contribution:

Oral