

Silicene on Ag(111): A Surface X-Ray Diffraction Study

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Abstract

Silicene – the silicon based counterpart of graphene – is a 2D honeycomb sheet consisting of Si atoms that has attracted much attention due to its fascinating characteristics. In contrast to graphene, silicene cannot exist as a free standing layer but instead it can only be grown almost exclusively on Ag(111). Moreover, it has been found out that the underlying substrate hinders the potentially intriguing electronic properties of silicene. The aim of this work is to determine the precise interaction of the Ag substrate by deriving a detailed structural model using surface x-ray diffraction (SXRD). This will give the key insight that is required, i.e. modification or substitution of the supporting substrate, to produce a true 2D silicene layer.

References

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- [2] Kara, A., et al., Surface Science Reports, 67 (2012) 1
- [3] Arafune, R., Surface Science, 608 (2013) 297
- [4] Feng, B., et al., Nano. Lett., 12 (2012) 3507

Figures

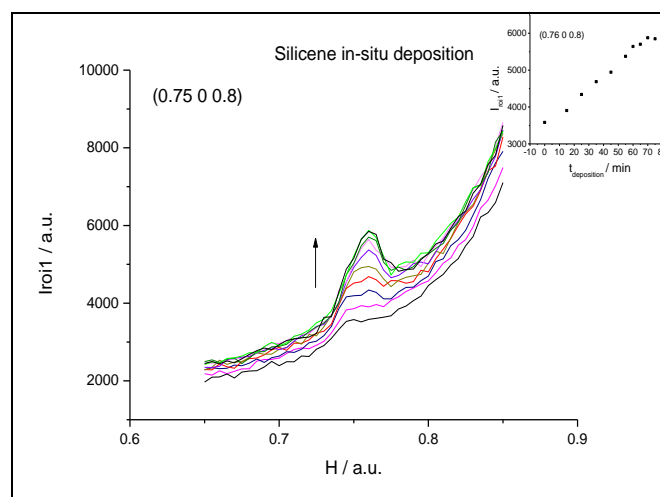


Figure 1: In-situ monitoring of 4x4 silicene structure growing on Ag(111) crystal

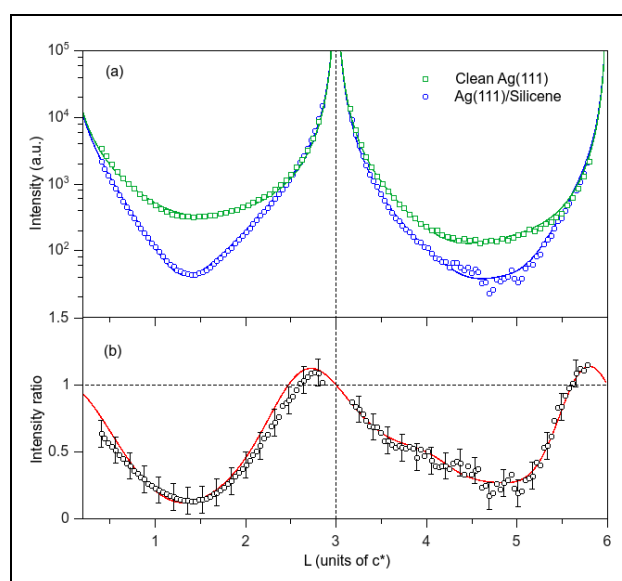


Figure 2: (a) Specular Crystal Truncation Rod (CTR), (0 0 L), data of the clean Ag(111) surface (green squares) and the Ag(111)/Silicene interface (blue circles). (b) The CTR data measured with silicene normalized to the clean Ag(111) data. The solid lines are fits to the data according to the structural model