2D Boron on Ir(111): Large-scale growth and photoemission study of interaction with alkali atoms

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Since the first experimental realisation of 2D epitaxial boron (*i.e.* borophene) in 2015 [1], there has been a growing interest in finding alternative routes to its synthesis [2] and revealing the morphology and properties of different polymorphs. This also includes examination of borophene-substrate interaction, as well as interaction with other atoms and molecules which can be used for functionalization of borophene. Here, we present our experimental results on segregation-enhanced epitaxy of borophene on Ir(111) and subsequent Li and Cs deposition on borophene at room temperature (Fig.1). Having employed borazine as a precursor, we grew borophene exhibiting a (6×2) superstructure on Ir(111) of high coverage, judging by the LEED (Fig.2) and AFM data. Surface mapping with ARPES and XPS demonstrate subtle changes in the electronic structure of Ir(111) after the growth and alkali decoration of the borophene. The spectra enlighten details of relevant interactions in the system and provide guidelines for future atomic-scale modifications of borophene.

References

[1] A. J. Mannix *et al.*, Science **6267**, pp. 1513-1516 (2015).
[2] K. M. Omambac *et al.*, ACS Nano **14**, 7421 (2021).

Figures

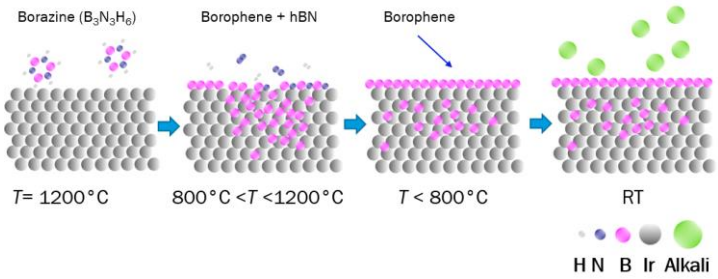

Figure 1: Scheme of segregation-enhanced epitaxy of borophene on Ir(111) and alkali deposition.

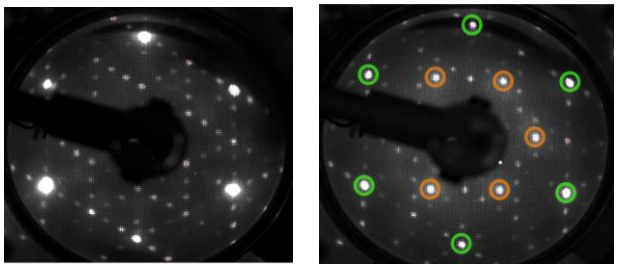

Figure 2: LEED pattern of borophene (6 x 2) superstructure on Ir (111) before (left) and after (right) Li deposition. Green circles mark Ir spots and orange ones mark the Li (√3×√3)R30° superstructure with respect to Ir (111).