

## van derWaals interactions mediating the cohesion of fullerenes on graphene

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Fullerenes on single-layer epitaxial graphene are a model system where to study very faint interactions at a molecular level. By means of variable temperature scanning tunneling microscopy from 40K to ambient temperatures we have been able to grow ordered fullerene layers exclusively bound by van der Waals interactions. The adsorption geometry of the molecules was computationally confirmed only if van der Waals and weak interactions had been included in the calculation formalism. In the context of these interactions, mutual orientation of fullerenes in their close-packed arrangement is found to be an important factor for the total energy. Observation of collective movements of some islands point out the weak coupling to the substrate and the important role of the Van der Waals cohesion forces within.

### References

[1] M. Švec, P. Merino, Y. J. Dappe, C. González, E. Abad, P. Jelínek, J.-A. M. Gago, *Physical Review B* **86**, (2012) 121407(R).

[2] Y.J. Dappe, J. Ortega and F. Flores, *Physical Review B* **79**, (2009) 165409.

### Figures

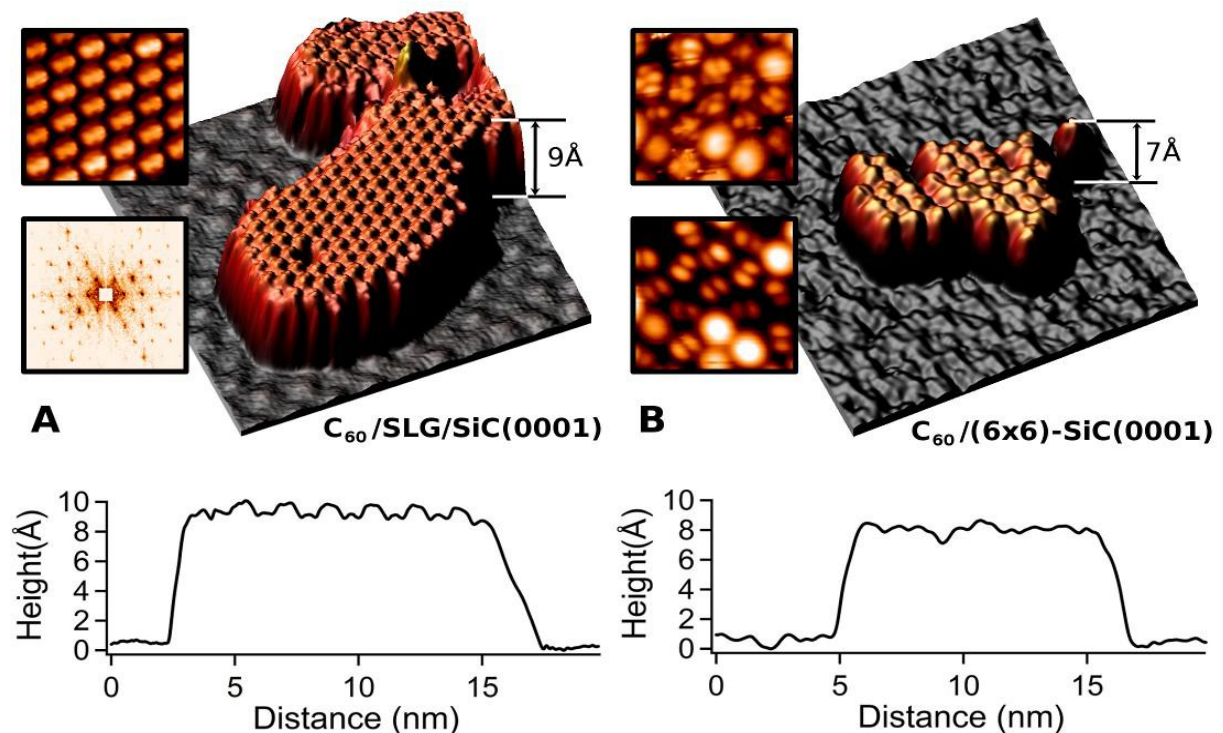


Figure 1: 3D representation of 20x20 nm<sup>2</sup> STM topography on C<sub>60</sub> islands and their corresponding profiles.