Hexagonal boron nitride

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Fifteen years ago, Watanabe and Taniguchi reported the synthesis of high-purity hexagonal boron nitride (hBN). This groundbreaking result revolutionised the physics and applications of this lamellar compound, which had been used in the industry for a long time because of its unique properties, such as a wide bandgap, low dielectric constant, high thermal conductivity and chemical inertness.

Watanabe and Taniguchi first highlighted the potential of this semiconductor for deep UV optoelectronics. They demonstrated lasing in the deep UV, at 215 nm, by accelerated electron excitation, and also the operation of field-emitter display-type devices in the deep UV. In contrast to other nitride semiconductors such as GaN and AlN, for which most stable crystalline phase is of the wurtzite type, the hexagonal structure of hBN makes it a prototype two-dimensional material, along with graphene and molybdene disulphide.

With a honey-comb structure based on sp^2 covalent bonds similar to graphene, bulk hBN, with its atomically smooth surface, has gained a great deal of attention as an exceptional substrate for graphene. Two-dimensional hBN, or 'white graphene', in the form of few-layer crystals or monolayers of hBN, has since emerged as a fundamental building block for van der Waals heterostructures.

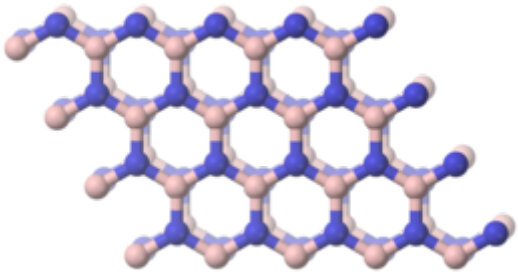

Figure 1 : hBN honeycomb structure

This Lavoisier Discussion will be the occasion to gather the French groups working on hBN in order to discuss the recent progress on this exceptional compound. An important objective is to bridge the different scientific communities studying, or using hBN. This two-day workshop will set the frame for debating the current and future challenges in the light of broad and multi-disciplinary expertises. In line with this objective, the scope covers all aspects dealing with hBN, from direct studies to all types of applications, e.g. synthesis, characterization, spectroscopy, theory, device fabrication…

In the spirit of the Lavoisier discussions, poster and oral presentations will be complemented by roundtable debates, concluding various topical sessions on hBN research. Possible themes are *Thermodynamical growth approaches and epitaxial ones*, *Fundamental electronic properties*, *hBN-based devices*, *Single Photon Sources*.

This Lavoisier Discussion is organized under the umbrella of the GDR *Graphene & Co* [1], in connection with the network of excellence *GaNeX* [2] on nitride semiconductors.

References

[1] http://www.graphene-and-co.org/
[2] http://www.ganex.fr/