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Einladung

zum

Physikalischen Kolloquium
Montag, 17.07.2017
16:15 Uhr in N24/H13

Dr. Gonzalo Abellán[1, 2]

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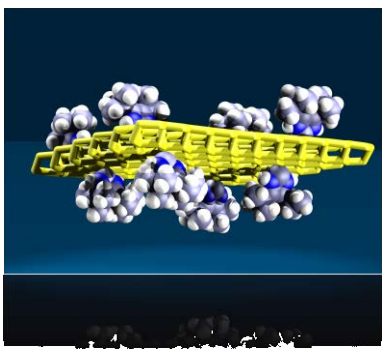
Chemistry of Novel 2D Materials Beyond Graphene: Black Phosphorus and Antimonene

Two-dimensional (2D) materials have attracted increasing interest in the last few years due to their unique morphology and properties and their use in a variety of applications, ranging from electronics to energy storage or catalysis, to name a few. Apart from various well-established 2D materials, such as graphene, h-BN, or MoS_2, black phosphorus (BP) has received considerable attention over the last two years because it's direct bandgap and his appealing properties for electronic and ultrafast optoelectronic applications. However, its lack of environmental stability severely limits its synthesis and processing.
We have recently demonstrated that high-quality, few-layer BP nanosheets, with controllable size and observable photoluminescence, can be produced in large quantities by liquid phase exfoliation under ambient conditions.[1] Moreover, we have developed a systematic study on the oxidation and passivation of mechanically exfoliated BP, deciphering the influence of thickness, lateral dimensions and visible light illumination in the stability of the exfoliated nanosheets.[2] Beyond this success, a more sophisticated chemical modification is highly desirable, like the molecular doping, that is an effective and flexible method towards modulating the electronic properties of 2D materials. Herein, we have developed a chemical route for the non-covalent functionalization of BP with different moieties, including electron-withdrawing organic molecules or tailor-made surfactants.[3] Additionally, we explored the bulk synthesis and structural characterization of BP intercalation compounds with alkali metals.
Finally, we have extended these concepts towards a new 2D material: antimonene, creating stable suspensions in water and developing its non-covalent functionalization.[4]

[1] D. Hanlon, et al., *Nat. Commun.*, 2015, *6*, 8563.
[2] G. Abellán et al., *J. Am. Chem. Soc.*, 2017, *under revision*.
[3] G. Abellán, et al., *Angew. Chem. Int. Ed.*, 2016, *55*, 14557.
[4] C. Gibaja, et al., *Angew. Chem. Int. Ed.*, 2016, *55*, 14345.



Ab 16.00 Uhr Kaffee, Tee und Kekse vor dem Hörsaal H13
Organisation: **Prof. Dr. F. Jelezko, Tel. 23750**
Host: **Prof. Dr. U. Kaiser, Tel. 22950, off.: 22951**