Towards the industrial production of novel 2D materials

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We will present our state-of-the-art progresses on the industrial scaling up of the production of novel 2D materials.[1-3] The 2D novel materials offer a whole spectrum of unique and unexpected properties in terms of their electronic structure, optical and mechanical properties or magnetism. However, defining scalable, reliable, and inexpensive production processes is a must for the extensive use of 2D materials in various applications,[1-8] involving a balance between final product quality and ease of fabrication. Based on theoretical calculations of binding energies and van der Waals character, more than 9000 inorganic layered materials have been classified in three classes – not exfoliable, potentially exfoliable and easily exfoliable.[9] The portfolio of synthetized materials of the easily exfoliable materials currently includes more than 100 different layered compounds suitable for exfoliation, ink formulation and device fabrication. Those include materials required in the fabrication of every component of an all-printed device.
We will show the efficiency of the manufacturing of high-quality novel 2D materials by wet-jet milling[3] and the path towards industrial production. We will show how the production of novel 2D materials in liquid phase by wet-jet milling[3] represents a powerful pathway towards the development of 2D materials-based energy devices, [4-8,10] offering massive integration flexibility compared to other production methods.

References

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This project received funding from the European Union's 2D-PRINTABLE Horizon Europe research and innovation program under Grant Agreement No. 694101.