

The tech transfer route from the lab to the mass volume production of 2D crystals

Francesco Bonaccorso

BeDimensional S.p.A. Via Lungotorrente Secca 30R, 16163 Genova, Italy

Email: f.bonaccorso@bedimensional.it

The industrial exploitation of 2D materials in various applications requires scalable, reliable, and inexpensive production processes,^[1-8] involving a balance between final product quality and ease of fabrication. We will present our industrial strategy to scale up the production of 2D materials,^[1-3] demonstrating the efficiency of the manufacturing of high-quality 2D materials by wet-jet milling.^[3,4] Afterward, we will provide an overview on key applications of the as produced 2D materials. We will demonstrate how the production of 2D materials in liquid phase by wet-jet milling^[3] represents a powerful pathway towards the development of 2D materials-based next-generation devices. In fact, our approach offers massive integration flexibility compared to other production methods. We will present insights in some of our business verticals,^[4-12] focusing on the conductive paste development.

References

- [1] F. Bonaccorso, *et al.*, **Materials Today**, 15, (2012), 564.
- [2] F. Bonaccorso, *et. al.*, **Adv. Mater.** 28, (2016), 6136.
- [3] A. E. Del Rio Castillo *et. al.*, **Mater. Horiz.** 5, (2018), 890.
- [4] M. A. Molina-Garcia, *et al.*, **J. Phys. Mater** 6 (2023), 035006
- [5] G. Iannaccone, F. Bonaccorso *et al.*, **Nature Nanotech.** 13, (2018), 183.
- [6] S. Pescetelli *et al.*, **Nature Energy** 7, (2022), 597-607.
- [7] P. Mariani, *et al.*, **Nature Comm.** 15, (2024), 4552.
- [8] A. Agresti, *et al.*, **Nature Comm** 17, (2026), 3394.
- [11] F. Bonaccorso, *et. al.*, **Science**, 347, (2015), 1246501.
- [12] E. Pomerantseva, F. Bonaccorso, *et al.*, **Science** 366, (2019), eaan8285.

This project received funding from the European Union's SHINE-PV Horizon Europe research and innovation action under grant agreement No. 101172902.

This project received funding from the Italian Ministero della Università e Ricerca (MUR) in the framework of the Project FIT4H2.
