
Robust collaboration between design, process, production and commercial teams : a key element to successfully scale-up advanced materials

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Context: Based on a unique technology, Carbon Waters develops, produces and markets performance additives for paints, polymers and composites based on 2D materials. Our products enable major advances in the fields of transport, renewable energies, energy storage and construction. Our experience has shown that the successful industrialization and commercialization of advanced materials, and in particular 2D materials, is a complex process requiring close collaboration between Research and Development (R&D), Production and Marketing. This presentation, based on concrete examples, highlights the specific challenges and the solutions implemented to deliver maximum added value for our customers.

Relationship between Material Typology and Obtained Properties: Material typology, including chemical composition, microstructure and manufacturing processes, directly influences final properties, such as mechanical strength, conductivity or durability. Understanding and mastering this relationship is crucial to developing materials that meet technical specifications while being suitable for industrial production processes. This understanding requires ongoing collaboration between R&D, which designs the materials, and Production, which manufactures them on a large scale.

Variability in the production of advanced materials: The high variability of materials within production batches is widely observed throughout the 2D materials industry. Even modest deviations in material quality can seriously compromise the quality of the final product, and explains why so many manufacturers are still reluctant to use this type of material. For a company specializing in 2D materials, the main challenge is to limit the variability of batch quality rather than the quantity produced. To achieve this, it is essential for R&D to work closely with production to optimize manufacturing processes and reduce these variations, as well as to set up a quality control system that guarantees uniform quality in line with strict market standards.

Design for customer needs: The commercial success of advanced materials obviously depends on their ability to meet specific customer needs. However, these specific needs are still often unknown, and the materials produced are not easily usable or do not generate the added value expected by users. At Carbon Waters, the marketing department works closely with R&D from the earliest stages of development to ensure that materials are designed with identified requirements in mind. This customer-centric approach enables us to create tailor-made solutions, increasing the chances of adoption by end-users.

Case studies and solutions developed by Carbon Waters: Case studies will illustrate how effective collaboration has overcome these challenges. These examples show that ongoing dialogue between R&D, Production and Marketing is essential to ensure successful industrialization and commercialization.

Conclusion: The industrialization of advanced materials cannot be successful without close collaboration between R&D, Production and Marketing. Reducing variability, designing materials according to type, and responding to customer needs are key steps in ensuring product quality, performance and commercial success. This integrated approach within an appropriate organization is essential to maintain a competitive edge in the advanced materials sector.
