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Make Innovation Happen: Scientific and Statistic Tools to Accelerate the Way Toward Technology Readiness Level TRL 9 – a Deployed Application

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We consider some tools / methodologies, scientific & statistics based, to design and optimize technological processes and the resulting products, by providing finally a robust design. Being implemented in R&D labs, such tools and methodologies could enable a faster skip from *lab experiments* to *real world* (i.e. Technology Readiness Level TRL 9) by catalyzing innovation, problem solving and even discovery. At the end of the day *to make innovation happen*.

We present also a successful example of application of such approach, to open also a larger discussion about the opportunity of intensively using such approach for nano scale organized materials and further products, with application also in biomedical engineering.

An usual cause for the difficulty of R&D labs to pass over the TRL 4 (= technology validated in lab) is the approach of testing the realized prototypes in the R&D lab, i.e. not taking into account the effective manufacturing conditions and environment, and the further operation conditions for the proposed and developed concept / product /device. To overpass that, the best practice shows the research scientists / engineers need to find from the beginning of the research and the development process the effective future manufacturing conditions / process parameters and the future real-life utilization of the resulting products (operating conditions) and to test their prototypes in such conditions.

But more than only testing, *it is crucial to provide a so called “robust design”* (Taguchi), i.e. to optimize the concepts / products parameters so they perform to expectations under a wide range of operating conditions, meanwhile being possible to be fabricated at lower possible cost and risk.