

Surfaces and Thin Films: a multidisciplinary area and a broad field of applications

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The theoretical concepts that describe the phenomena in surfaces and thin films comprise physics, chemistry, biology and materials science. We make use of this multidisciplinary approach in the study of heterogeneous catalysis, for example, or surface modification of a material via plasma, chemical etching, ion implantation, radiation or thin film deposition. The field of surface modification has brought about significant technological advances. There are countless well-established surface treatments in the industry, with emphasis to those applied to metallic materials for increasing corrosion and wear resistance, applied to silicon to increase the efficiency of solar cells and applied to biomaterials to promote chemical changes that enhance cell adhesion. In addition to being used as protective or surface coatings, thin films may also constitute the active layer of micro- and nanoelectromechanical actuators (MEMS and NEMS), optical filters, optoelectronic and magnetic devices, gas sensors, self-cleaning surfaces and other applications. Thin films also play an important role in microelectronic chips to be used as dielectrics and conducting layers.

All the knowledge acquired in these traditional applications gave rise to new fields of investigation, especially with the advent of nanomaterials. Therefore, the science of films and surfaces is present nowadays in dentistry, waste treatment, energy conversion, medicine, just to mention a few examples. The emergence of two-dimensional materials, such as graphene, and the numerous studies focused on the functionalization of surfaces indicate the possibility of new technological applications such as in microsupercapacitors or nanoparticle-based drug delivery systems for cancer therapy [1, 2].

In this regard, the study of the physicochemistry and structure of surfaces is quite relevant, and therefore the *Matéria* journal, which publishes articles on Materials Science and related subjects, includes a section dedicated to Films and Surfaces, presenting the latest achievements in this field. In this issue (V. 27, n.1), the reader will find some of these articles, which address topics such as photocatalysis, waste treatment, among others. Enjoy the reading!

REFERENCES

- [1] Andrea C. Ferrari, Francesco Bonaccorso et al., “Science and technology roadmap for graphene, related two-dimensional crystals, and hybrid systems”, *Nanoscale*, vol. 7, p. 4598, 2015.
- [2] Karolina Wieszczycka, Katarzyna Staszak, Marta J. Woźniak-Budych, Jagoda Litowczenko, Barbara M. Maciejewska, Stefan Jurga, “Surface functionalization – The way for advanced applications of smart materials”, *Coordination Chemistry Reviews*, vol. 436, p. 213846, 2021.

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