

Science Highlights

Our Institute has stimulated and/or started a series of collaborations between high qualified research groups from different institutions.

We advanced in the description of the thermal stability of surfaces and interfaces that are relevant for (nano) electronics. We have studied the semiconductors SiC and Ge; the dielectrics LaLuO₃, HfO₂, Al₂O₃, and SiON; and the metal Pt. By understanding the transport of oxygen, nitrogen, hydrogen, and different heavier elements in these materials we expect to contribute for their use in electronic devices that provide high performance and low power consumption.

Besides the development of new deposition processes and surface treatments based on cold plasmas with potential applications in metal-mechanics, textile and biomedical industries, our researchers developed a new high performance coating: diamond-like carbon (DLC)-nanodiamond composite films which are promising materials for tribological applications. Further improvement on DLC and titanium-based coatings are expected as a result of the present investigations.

We are developing a new technique to characterize nanostructures on a surface using medium-energy ion scattering. We have already determined shape and size distribution of the Au nanoparticles (NPs) adsorbed on a multilayered film of weak polyelectrolytes and Pb nanoislands at Si/SiO₂ interface. The results are very promising and open new perspectives to analyze core-shell NPs and to investigate the formation of nanostructures in situ.

In the following sections some of these results are described in detail. At the end of this section one can find a complete list of publications, patents and communications presented in international conferences. The highlights of the scientific production can also be found in our website: <http://www.engenhariadesuperficies.com.br>.