

Coatings production for civil and military markets

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Emerging civil and military markets are increasing the need for engineered coating solutions, whereas existing markets demand coatings with improved properties, decrease the coating application costs, and innovatively recycle materials...

The primary reason for the interest in coatings is its wide variety of potential applications in diverse fields such as protection of materials from corrosion, abrasion, application in filters, fire-resistant coatings, anti-fog, memory and biomedical devices....

Coating properties depend on a number of interrelated parameters and also on the manufacturing technique. Due to its properties (easy control, environmental friendly, versatility, easily scalable and low cost) sputtering methods are among the most used techniques for coating production.

Sputtering is traditionally employed to coat planar surfaces. However, by using coaxial sputtering the inner surface of pipes can be also coated.

Coating engineering is based on the concept of tuning the coating properties to the desired value. In principle this can be easily done in those sputtered coatings since their properties strongly depend on the parameters used in the sputtering process, such as working gas pressure, distance between the target and the substrate, substrate temperature, and voltage applied to the cathode. Moreover, the chemical composition of the target can be designed by using reactive sputtering. It is worthwhile to mention that such a selection also allows improving the adhesion of the coating to the surface, which is one of the most critical points.

In this talk, the capabilities of sputtering to develop corrosion, oxidation, and abrasion protective coatings as well as, lubricating and radiation-resistant coatings will be shown highlighting those related to Security and Defense. The influence of the sputtering parameters on the coatings properties will be illustrated. The capabilities and ongoing work of the Institute of Nuclear Fusion related to the fabrication of coatings will be presented.

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