

POC020

**Multifunctional coatings with antibiofouling properties**Jose Castro<sup>1</sup>, Jose Castro<sup>2</sup>, Isabel Carvalho<sup>3</sup>, Mariana Henriques<sup>4</sup>, Sandra Carvalho<sup>2</sup>

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*Biofouling is “the accumulation of microorganisms, plants, algae, or small animals on wetted surfaces that have a mechanical function, causing structural or other functional deficiencies”.* Biofouling process has enjoyed a special attention for its affectation to a big number of different pieces from different applications: offshore platforms, vessels, biomedical devices, architectural pieces, decorative pieces... All aforementioned applications have a common need, achieve a multifunctionality in order to accomplish its main function, avoiding biofouling formation. Focusing in this issue, doped metallic oxynitrides are a plausible solution, bringing to the board an interesting viewpoint of multifunctionality in surfaces: aesthetics and antibacterial. The present study developed Ti(O)N and Zr(O)N films doped with two different biocides agents, silver and copper. Reactive direct current magnetron sputtering with reactive gas pulsed process was used in order to obtain the aforementioned films over metallic samples. Physical, chemical and morphology characteristics were assessed, as well as functional properties like colour variation, wettability, roughness and antibacterial resistance. Comparing the colour palette, Zr(O)N got a wider variation than Ti(O)N system. Blue, rose-gold, golden, purple and black tones were obtained. Antibacterial and antibiofouling tests proved that the biocidal agents inhibited *S. epidermidis* and microalgae growth. The coatings developed by the present study can be easily tunable to the desirable decorative purposes with antibacterial and antibiofouling.

**Keywords**

Multifunctional

Antibiofouling

Aesthetic

Oxynitride