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Highlight Lecture

Corrosion and properties of low temperature plasma carburized austenitic stainless steel

📅 Thursday (27.09.2018)

🕒 14:45 - 15:00 📍 S1/03 - 123 (/index.php?

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📌 Part of:

F02.3: Corrosion and Wear Protection Control Session

📅 Thursday (27.09.2018)

🕒 14:45 - 16:15

TEMPERATURE PLASMA WEAR PROTECTION CONTROL

SURFACE ENGINEERING

STEELS
FUNCTIONALISATION

Austenitic stainless steels have good corrosion resistance, and are used for several applications. Nevertheless, they are limited due to their poor tribological properties. Surface hardening by means of plasma assisted techniques have been developed to overcome this problem without compromising the corrosion resistance.

This work has the aim of develop and characterize the low temperature plasma carburizing of stainless steel AISI 316L of two different grades (commercial and medical grades). The process was carried out in an experimental reactor in UL-Nancy, France, designed for low-pressure plasma treatments. Differences among three applied bias and the two mentioned steel grades were characterized.

In order to characterize the surface layer, GDOES and XRD have been carried out. Results show a region close to the surface with a high amount of C in solid solution, then a concentration plateau in the layer, and a final region with concentration decreasing profile, reaching the stainless steel C concentration. A small amount of nitrogen close to the surface was also found, attributed to chamber contamination.

Regarding tribological properties, pin on disc and reciprocating sliding were performed. For both materials, an increase in the applied bias produces a decrease in the friction coefficient, and lower wear rates. This is attributed to an increase of the surface hardness produced by an increase of the applied bias.

Corrosion resistance have been characterized using anodic polarization tests in NaCl 3.5%, with a three electrodes configuration (Pt as counter, SCE as reference and the sample as working). There is no significant changes for the different applied bias, while the medical grade has a superior corrosion resistance, for all the plasma carburizing treatment conditions.

Speaker:



Ph.D. Lisandro Escalada (https://2018.mse-congress.de/index.php?id=3045&L=0&tx_management_profile%5Bpk%5D=fvwwwu6kokcu1c70l1kooCoPe&tx_management_profile%5Baction%5D=index&tx_management_profile%5Bcontroller%5D=1)

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Symposium	
● F02: Surface Engineering and Functionalisation (/index.php?id=5980&L=0&tx_dgmprogram_fullprogram%5Bcategory%5D=1600&tx_dgmprogram_fullprogram%5Baction%5D=singleview&tx_dgmprogram_fullprogram%5Bcontroller%5D=1)	
F02.1: Wear and Friction Reduction	Session
📅 Thursday (27.09.2018)	
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F02.2: Nanomaterials and Nanostructuring	Session
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F02.3: Corrosion and Wear Protection Control	Session
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F02.4: Sensors and Wetting Control	Session
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F02.5: Bioresponse to Functionalized Surfaces	Session
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