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Thesis

Corrosion and protection of AA2024 aluminium alloy by cerium compounds in chloride medium

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Dedicated to my wife Soumaya and my son Amr

And of course, to my parents

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Abbreviations

AC	Alternating Current
AFM	Atomic Force Microscopy
CE	Counter Electrode
C_{oxy}	Capacitance of the superficial oxide layer
CRL	Confidential Range Limit
CV	Cyclic Voltammetry
DC	Direct Current
E_{corr}	Corrosion potential
EDX	Energy Dispersive X-ray Spectroscopy
EIS	Electrochemical Impedance Spectroscopy
E_{pit}	Pitting corrosion
i_{corr}	Corrosion current density
ICP-OES	Inductively Coupled Plasma - Optical Emission Spectroscopy
IE	inhibitive efficiency
LSV	Linear Sweep Voltammetry
OCP	Open Circuit Potential
OMM	Optical Metallographic Microscopy
$Q = CPE$	<i>Constant phase element</i>
Q_{edl}	Electric double layer <i>Constant phase element</i>
Q_{salt}	Constant phase element describing the deposited derivative salt film
R_{ct}	Charge transfer resistance
RE	Reference Electrode
R_{el}	Electrolyte resistance

R_{oxy}	Resistance of the superficial oxide layer
R_p	Polarization resistance
R_{salt}	Electric resistance of deposited derivative salt film
S	Standard deviation
SEM	Scanning Electron Microscopy
W	Warburg element referring whatever diffusion processes in the electrolyte
WE	Working Electrode
XPS	X-ray Photoelectron Spectroscopy
$ Z $	Impedance modulus
Z'	Real impedance value
Z''	Imaginary impedance <i>value</i>
γ	Protective ability coefficient
δ	Relative standard deviation
φ	Phase shift between the current and potential sinusoids
χ^2	Reliability criterion
\bar{X}	Average statistical value

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