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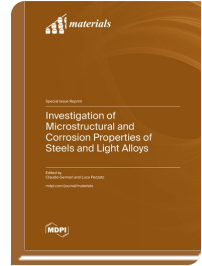


Special Issue Reprint

Investigation of Microstructural and Corrosion Properties of Steels and Light Alloys

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Edited by
Claudio Gennari
Luca Pezzato



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According to the latest NACE estimation (2013), the global cost of corrosion is equivalent to approximately 3.4% of the global GDP (2.5 trillion US dollars), not considering environmental consequences or safety issues. A reduction between 15% and 35% could be realized if prevention techniques and proper precaution are used, which means savings between 375 and 875 billion US dollars. Corrosion involves different sectors such as industry, military, civilian, services, etc., in particular energy production, transport, chemical and petrochemical industries, the mechanical industry, and drink and beverage. Among these sectors, most of the constituents are made out of steel, which is the most produced metal in the world (1808 million tons in 2018), or light alloys, mainly aluminum (60.1 million tons of consumption in 2018).

A proper alloy design in terms of composition, heat treatments, microstructural features, etc. is mandatory in order to obtain the best combination of mechanical properties and corrosion resistance during operation, reducing maintenance costs and the overall impact on the global economy. In fact, microstructural features can affect both the corrosion of the material itself and the eventual production of protective layers on its surfaces.

The purpose of this Special Issue was to correlate the key role of the microstructure of steels and light alloys to their corrosion properties.



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