



Special Issue on Corrosion and Coating Technology

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Published online: 8 April 2024

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Corrosion causes the deterioration of metals and alloys by the chemical or electrochemical reaction with their surrounding or service environment. During the process of corrosion, the candidate alloy which generates electrons accompanied by loss of metal ions becomes anode whereas the electrode at which electrons are consumed by the chemical species (such as H^+ and O_2) becomes cathode in corrosive media. While the corrosion is one among the several factors that cause failure of the components, it is often the only life limiting attribute. Failure of the components and infrastructures due to corrosion and associated reasons enormously impact the industries and society at large. Various surveys and estimates over several years indicate that the corrosion-associated losses are equivalent to more than 3.5% of the GDP of any country in addition to valuable human life loss due to catastrophic failure. This number can be easily expected to be even larger for the developing countries in view of growing industrialization and urbanization such as in India, and therefore, it is obviously a serious concern. Further, as the entire world is moving toward the decarbonization, zero waste/increasing recycling, and demand for enhanced efficiency from the processes, material's performance due to increasing environmental corrosivity is being challenged. Integrity and performance of engineering components and infrastructures, hence, appear to be the foremost concern for sustainable growth of nations. The potential for the growth of the infrastructure and industrial sectors in India is huge; the infrastructure (such as energy, road, urban, railway, waterways, airways, and airports) which is backbone of the

economy, in particular, is expected to grow at >9% CAGR. Demands for metals and alloys may surge accordingly; the demand of steel which is considered as a workhorse of the infrastructure alone is predicted to grow by 10% and so the other alloys. The reasonable volume of corrosion losses can be minimized by the knowledge enhancement of operators and engineers at shop floor, continuous corrosion monitoring in place, and by adopting appropriate corrosion preventive technologies. Among various corrosion preventive methodologies, options available are such as selection of cost-effective corrosion resistant alloys, coatings, inhibitors, cathodic and anodic protection, and alteration of corrosive environment.

In this special issue of corrosion and coatings technology, a total of 20 original contributions have been included. This issue evolved after we have conducted an International Conference on Corrosion and Coatings (i3C)-2022 at CSIR-National Metallurgical Laboratory Jamshedpur, INDIA under the aegis of Indian Institute of Metal (IIM) Jamshedpur chapter, Tata Steel Limited, CSIR-National Metallurgical Laboratory and NIT Jamshedpur. The authors who attended and presented during i3C were invited to submit their original manuscripts to the journal and after established peer-review process of Springer, 20 manuscripts were accepted for publication in this issue. The manuscripts encompass various aspects of corrosion such as crevice corrosion, flow assisted corrosion, hot/ molten salt corrosion, corrosion of high entropy alloys, and various coating technologies for corrosion prevention such as hot dip coatings, zinc electroplating, thermal barrier coatings, and polymeric coatings.

It is strongly believed that special issue on corrosion and coatings technology will serve as an excellent compendium to corrosion and coating technologists and engineers across the globe. The editors express their profound gratitude to

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Jamshedpur chapter of Indian Institute of Metals (IIM) for entrusting the organizing committee to host the international conference on corrosion and coatings (i3C) and bring out this special issue on corrosion and coatings technology. The i3C has been highly successful and attended by nearly 150 participants and experts from different organizations and countries who shared their knowledge at such an interactive platform.

We sincerely appreciate the authors of the manuscripts, the reviewers for providing their valuable inputs to improve the overall quality of manuscripts, and the publishing team. Sincere thanks are also due to the Chief Editor and Managing editor of Transactions of the Indian Institute of Metals for their constant support and encouragement to bring out this issue.

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