

Special Issue

Protective Coatings/Films for Electrodes: Novel Materials and Corrosion Prevention Mechanisms

Message from the Guest Editor

Corrosion remains a persistent challenge in industrial manufacturing, causing significant economic losses and safety risks. Among various mitigation strategies, electrode protection—particularly photocathodic protection (PCP)—stands out as an efficient, cost-effective, and environmentally friendly solution. By integrating photoelectric conversion with cathodic protection, PCP offers key advantages, including energy efficiency, minimal maintenance, broad applicability, and sustainability. Novel photoanode materials (e.g., BiVO₄, TiO₂, ZnIn₂S₄, CuBi₂O₄) and their heterostructures (Type II, S-scheme, Z-scheme) for improved charge separation and visible-light absorption.

- Advanced co-catalysts and modifiers (e.g., Co₃S₄, WO₃, quantum dots, MOFs) to boost PCP's kinetics and durability.
- Mechanistic insights into interfacial charge transfer, corrosion inhibition pathways, and long-term stability in harsh environments
- Integrated systems combining PCP with self-healing coatings, high-entropy alloys, or electrochemical techniques.
- Innovative substrate engineering, including the development of nanotube arrays, porous films, and hybrid coatings for metals

Guest Editor

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About the Journal

Message from the Editorial Board

Now more than ever, research is asked to deliver knowledge and technologies to solve the major challenges faced by our society. The development of new materials and devices for (without the ambition to be exhaustive) energy, health and food technology, together with the need for establishing processes that reduce the impact on critical resources and the environment, is indeed in the spotlight of most contemporary research. Surface science and engineering play a key role in this regard, with an incredible potential in delivering new and deep scientific understanding and technical solutions essential to solve most of the major societal challenges.

Coatings is a well-established, peerreviewed, online journal dedicated to the vibrant field of surface science and engineering. Coatings publishes original research articles that report cutting-edge results and review papers that make the point on the hottest research topics.

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