





## **Abstract**

Prussian blue and Prussian blue analogues have attracted increasing attention as versatile framework materials with a wide range of applications in catalysis, energy conversion and storage, and biomedical and environmental fields. In terms of energy storage and conversion, Prussian blue-based materials have emerged as suitable candidates of growing interest for the fabrication of batteries and supercapacitors. Their outstanding electrochemical features such as fast charge-discharge rates, high capacity and prolonged cycling life make them favorable for energy storage application. Furthermore, Prussian blue and its analogues as rechargeable battery anodes can advance significantly by the precise control of their structure, morphology, and composition at the nanoscale. Their tunable structural and electronic properties enable the detection of many types of analytes with high sensitivity and specificity, and thus, they are ideal materials for the development of sensors for environmental detection, disease trend monitoring, and industrial safety. Additionally, Prussian bluebased catalysts display excellent photocatalytic performance for the degradation of pollutants and generation of hydrogen. Specifically, their excellent light capturing and charge separation capabilities make them stand out in photocatalytic processes, providing a sustainable option for environmental remediation and renewable energy production. Besides, Prussian blue coatings have been studied particularly for corrosion protection, forming stable and protective layers on metal surfaces, which extend the lifespan of infrastructural materials in harsh environments. Prussian blue and its analogues are highly valuable materials in healthcare fields such as imaging, drug delivery and theranostics because they are biocompatible and their further functionalization is possible. Overall, this review demonstrates that Prussian blue and related framework materials are versatile and capable of addressing many technical challenges in various fields ranging from power generation to healthcare and environmental management.



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