
Research on the photoelectric properties of silicon-based photoanodes for the protection of photocathodes of shipborne electronic equipment

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Abstract In this study, n-type silicon nanowire arrays (SiNWs) are used to replace the traditional TiO_2 , and PEDOT:PSS is composited with the photoanode SiNWs to construct a new type of composite photoanode based on PEDOT:PSS thin film/silicon nanowire arrays, and simulate the marine environment to establish a photogenerated cathodic protection system for the photoanodes and the metal electronic materials in the shipborne electronic equipment. The above composite photoanode's good light absorption performance, stability and electron transfer performance are utilized to improve the protection ability of the photoanode on 304 stainless steel, and the optical performance, electrochemical performance and cathodic protection mechanism of the composite photoanode are investigated. Especially in the dark state, the electrons stored in PEDOT:PSS can provide continuous cathodic protection for metal materials, realizing long-term and stable metal corrosion protection.

Keywords: PEDOT:PSS/SiNWs; Silicon nanowire arrays; Dark-state protection; Anti-corrosion