Electric charge excitation and transfer of triboelectric nanogenerator for corrosion protection

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Abstract The triboelectric nanogenerator (TENG) is based on the triboelectric effect and electrostatic induction, which provides an effective method to collect mechanical energy such as tide and wave in the marine environment into electrical energy. Compared with sacrificial and impressed current cathodic protection, this method can use green energy for the marine metal corrosion protection. However, the output performance of TENG mostly depends on the friction materials of the electrodes. The composite of PDA and MXene was used to construct PDMS sponge structure for the TENG electrode, and the process of electric charge excitation and transfer is investigated. The results indicates that the customizing sponge structures have large pores with enhancing contact friction and extraordinary pressure resistance. The charge can transfer between different electrodes due to the difference of the dielectric properties, and the Mxene act as good conductor for the transfer. Besides providing electric energy for monitoring instruments and corrosion protection, the sponge TENG also has sensitive response of the different pressure, and the electric current value reflects the strength of the impact force, which can act as the indicator wave level.

Keywords charge excitation, triboelectric nanogenerator, corrosion protection

Reference

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