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An Innovative Electro-Fenton Degradation System Self-Powered by Triboelectric Nanogenerator Using Biomass-Derived Carbon Materials as Cathode Catalyst

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Abstract

Based on the advantages of electro-Fenton (EF) and our works on the flexible design of triboelectric nanogenerator (TENG) and biomass carbon materials, a self-powered EF system is demonstrated. It is driven by a robust and flexible multilayered TENG (RFM-TENG) using carbon materials derived from magnolia flowers as the cathode for oxygen reduction. The synthetic mesoporous carbon materials have a large surface area ($1226 \text{ m}^2 \text{ g}^{-1}$), favoring dissolved oxygen mass transfer and promoting the oxygen reduction process. With the sponge as the buffer layer and pre-charge injection, the short-circuit current, transferred charge and open-circuit voltage of RFM-TENG are $960 \mu\text{A}$, $2.8 \mu\text{C}$ and 1050 V , respectively, and the maximum power

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