Intrinsic asymmetric iontronic-interfaces for giant power generation: methods and sensitivity checks

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Iontronic power source harnesses ion-electron coupling effect for energy conversion, offering great potential in wearable electronics and bioelectronics. However, its limited power density and insufficient current hinder the progress toward commercialization. Here we report an iontronic electricity generator based on intrinsic asymmetric interfaces and controllable energy-release, which reaches a maximum volumetric power density of up to 3680 W m -3 , area power density of 18.4 W m -2 , and peak current of more than 5 A. Cycling power generation is ascribed to reversible electron-coupled ion-oscillation at interface. Synergistically, the intrinsic asymmetric interfaces facilitate ion-electron coupling interaction, and the energy-release gate optimizes the energy conversion pathway, thus ensuring giant power output. The developed generator shows large-scale manufacturability and good flexibility. These exceptional performances in iontronic power source not only offer useful paradigms for wearable electronics, but also indicate a strategy and direction into high-power energy conversion from low-grade environmental source.

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