Redox-active rGO/POM// MXene Hybrid Supercapacitor

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To enhance the energy storing capacity of the hybrid supercapacitor (HSC), it is necessary to find the appropriate positive and negative electrode materials working in identical electrolytes. In present work, we have developed the redox-active HSC by using the 2D reduced graphene oxide (rGO)/polyoxometalates (POMs) and MXene (Ti_3C_2Tx) as a positive and negative electrode, respectively. The prepared rGO/POMs and Ti_3C_2Tx demonstrate the enhanced energy storing capacity in positive and negative potential range with 631 and 407 F/g capacitance, respectively. The assembled redox-active rGO/POM//Mxene HSC cell shows the higher working voltage of 1.4 V with specific energy of 50.46 Wh/Kg. In addition, the cell demonstrate the excellent cycling stability over 10000 cycles with capacitance retention of 95%. This work provides a new way of thinking to develop high-performance energy storage devices with excellent energy density, power density, and ultra-long-cycle life.