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1 **Conducting α -Fe₂O₃ Nanorod/Polyaniline/CNT Gel Framework for**
2 **High Performance Anodes towards Supercapacitors**

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10 **ABSTRACT:** Thick-electrode design toward high energy density per device is of
11 particular importance for supercapacitors to store large amounts of energy, but this
12 remains a seemingly insurmountable challenge due to sluggish electron transport. The
13 challenge is addressed herein by developing an electrically and ionically conducting
14 framework which consists of α -Fe₂O₃ nanorods, multi-walled carbon nanotubes (CNTs)
15 and polyaniline (PANI) hydrogel. The interconnecting composite framework is formed
16 by *in situ* polymerizing aniline on the surface of α -Fe₂O₃ nanorods and CNTs; the
17 nanorods are found to well disperse in the matrix. The framework can provide
18 low-resistance, continuous transport pathways for both electrons and electrolyte ions in
19 the entire electrode system, maximizing the energy use of the nanorods. An anode of
20 ~100 μm in thickness is fabricated using the composite framework, corresponding to a
21 mass loading of 9.3 mg cm^{-2} . It delivers high area capacitance of 2434.7 mF cm^{-2} and
22 cycling capacitance retention of 96.3 % after 10,000 cycles. This work would shed light

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