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Diversified applications of polypyrrole/graphene aerogel in supercapacitors and three-dimensional electrode system

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Abstract

Exploring the diversified application of materials can fully tap the available value of material. Herein, first we synthesized polypyrrole/graphene aerogel (PGA) with in-situ polymerization, and then applying to supercapacitors and three-dimensional (3D) electrocatalysis system. The electrical capacity reached 347.71 F/g at 5 mV/s and satisfactory cycling stability (retaining 95.0% after 2000 cycles). The 3D electrode system showed excellent catalytic performance that the removal rate of Cr(VI) reached nearly 100% within 60 min along with superb repeatability. Furthermore, spent PGA from supercapacitors was recycled and reused as particle electrodes, and found that the reclaimed PGA still had very high activity. This work also provided a new way for the reutilization of waste materials from supercapacitors. Anyhow, excellent performance proved that PGA was an appropriate material in electrochemical fields.

Keywords: Polypyrrole; Graphene; Functional; Nanocomposites; Supercapacitors; Particle electrode.

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