Nature-inspired Biomass Material: from Cr-containing Wastewater Purification to Efficient Energy Storage

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With the increasing concern about environmental protection and effective resource usage, Cr-containing wastewater purification and Cr recycling are getting more and more important. Inspired by the Cr-enrichment capability of mushroom, the behavior of Cr-containing wastewater purification is explored using biomass material (Pleurotus Ostreatus) as an adsorbent. A novel strategy is also developed to prepare anode materials for Li-ion capacitors using Cr-containing Pleurotus Ostreatus as the precursor. It is revealed that Pleurotus Ostreatus exhibits high adsorption capacity (37.98 mg g-1) for Cr ions, and the purification behavior fits well with the pseudo-second-order kinetic model; In virtue of the reduction ability of carbon, Cr-containing Pleurotus Ostreatus is successfully transformed into carbon/Cr (III) oxide composite, efficiently decreasing the toxicity of Cr (VI); To ensure the effective resource usage, the as-prepared composite is further used as anode for Li-ion capacitor, realizing the assembly of energy-storage device with high energy density (113.0 Wh kg-1) and power density (6.7 kW kg-1). This nature-inspired work not only provides a novel ideal for effective resource usage but also opens a new way for energy material preparation.

Awards Won:
Third Award of $1,000