Title:	Soya derived heteroatom doped carbon as a promising platform for oxygen reduction, supercapacitor and CO2 capture
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Keywords:	Cathode material CO2 capture Doped carbon Oxygen reduction reaction
Issue Date:	2017
Publisher:	Elsevier Ltd
Citation:	Carbon, 114
Abstract:	Doped carbon allotropes are promising materials for use in a range of applications in energy harvesting and gas adsorption. Synthesis of multifunctional C is however challenging as it requires simultaneous control over surface area, conductivity, chemical nature and loading of heteroatoms in the carbon matrix, usually yielding a material at a time that favours a single application. Pyridinic-N on C-surface, for instance, facilitates oxygen reduction (ORR) and CO2 capture, whereas more heteroatom enhances capacitance. Here we report on soya derived N-doped carbon having high surface area of 1072 m2/g and exhibiting superior performance for all these applications. Supercapacitors made of this material is operable in a wide potential window and possesses specific energy density of 24.3 Wh/kg with 93% capacitive retention beyond 10,000 charge-discharge cycles at a high 10 A/g discharge rate. It also exhibits one of the best performances among bio-derived materials towards ORR with half wave potential of −0.211 V (vs. SCE) in alkaline solution that involve facile multi-electron transfer at rate determining step. Further at 1 bar pressure, it captures an appreciable 14 wt% CO2 at 25 °C and 57.7 wt% at −78 °C
Description:	Only IISERM authors are available in the record.
URI:	https://agris.fao.org/agris-search/search.do?recordID=US201700136242 (https://agris.fao.org/agris-search/search.do?recordID=US201700136242) http://hdl.handle.net/123456789/2602 (http://hdl.handle.net/123456789/2602)
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