

## Materials Poster Abstract

### High Performance Li/S Batteries using as Mould a Disordered Carbon with Dual Porosity Derived from Cherry Pits

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A micro- and mesoporous carbon obtained from cherry pit wastes and activated with  $\text{H}_3\text{PO}_4$  acid has been studied as sulfur host for Li/ batteries. The carbon and the corresponding composite were characterized by different techniques: X-ray diffraction, Raman spectroscopy, scanning electron microscopy, X-ray photoelectron spectroscopy, thermogravimetric analysis and  $\text{N}_2$  adsorption/desorption measurements. The carbon has a high specific surface area of  $1662 \text{ m}^2 \text{ g}^{-1}$  ( $S_{\text{BET}}$ ) and a micropore and mesopore volume of  $0.57 \text{ cm}^3 \text{ g}^{-1}$  and  $0.40 \text{ cm}^3 \text{ g}^{-1}$ , respectively<sup>1</sup>. The S/carbon composite, with 57 % sulfur content deposited by the disproportionation reaction of a  $\text{S}_2\text{O}_3^{2-}$  solution in acid medium and without an additional heating step above S melting point, delivers an initial specific capacity of  $1148 \text{ mAh g}^{-1}$  at a current of C/16 ( $C=1675 \text{ mA g}^{-1}$ ), with a high capacity retention of  $915 \text{ mAh g}^{-1}$  after 100 cycles and with a coulombic efficiency close to 100 %. The good performance of the composite was also observed under higher rates and long-term cycling tests. The capacity delivered by the cell after 200 cycles was 707 and  $410 \text{ mAh g}^{-1}$  at C/2 and 1C, respectively, maintaining the high coulombic efficiency. The overall electrochemical response of this carbon as sulfur matrix is among the best reported so far for other biomass-derived carbons and its origin is assignable to the micro and mesopore system formed upon activation.

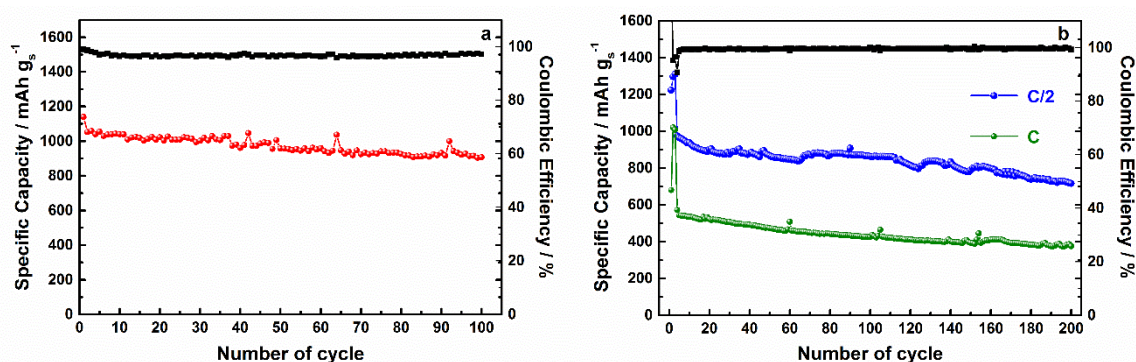


Figure 1 Cycling tests at C/16 (a), C/2 and C (b) of the composite.

## References

1. Olivares-Marin, M.; Preparation and characterization of active carbons from agroindustrial wastes, PhD Thesis, Extremadura University, 2007.