## Materials Poster Abstract

# Bio-waste derived carbon: Scaffold for sulfur cathode and interlayer for Li-S batteries

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Abstract content

Activated bio-waste driven carbon has been explored as a scaffold for sulfur and to function as an interlayer in lithium-sulfur battery to realize superior lithium storage properties by conversion reaction. Usually, porous carbon materials derived from bio-origin is attractive due to presence of one or more inherent volatile components that act as porogen for the creation of pores in the final product (carbon) and the pores thus created will be further enhanced through chemical activation method. Herein, activated jamun seed derived carbon (JSC) stabilizes sulfur in amorphous state up to 50 wt.%, which is an indirect measure of sulfur loading ability of JSC as 50 wt. %. Sulfur (Fig. 1) confined insides the pores of thus prepared bio-carbon scaffold shows typical and characteristic electrochemical behaviour of sulfur in Li-S system. Two sharp and distinguishable reduction peaks appear around 2.35 and 2.06 V and the corresponding oxidation peaks are located at ~ 2.32 and 2.39 V, ensuring cyclic reversibility. Galvanostatic cycling studies of 40, 50 and 60 wt.% sulfur loaded JSC cathode exhibits an initial discharge capacity of 845, 974 and 814 mAh/g respectively under the influence of C/10. Moreover, JSC/S-60 cathode exhibits better cycleability by way of retaining 571 mAh/g capacity up to 50 cycles. Similarly, encouraging results have been realized especially when JSC has been exploited as interlayer (Fig. 2). Interestingly, JSC interlayer configuration exhibits nearly half of the shuttle current realized without interlayer.

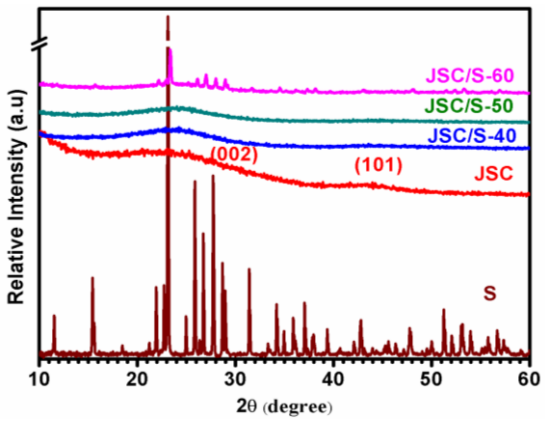


Fig. 1 XRD indicating the sulfur loading ability of JSC

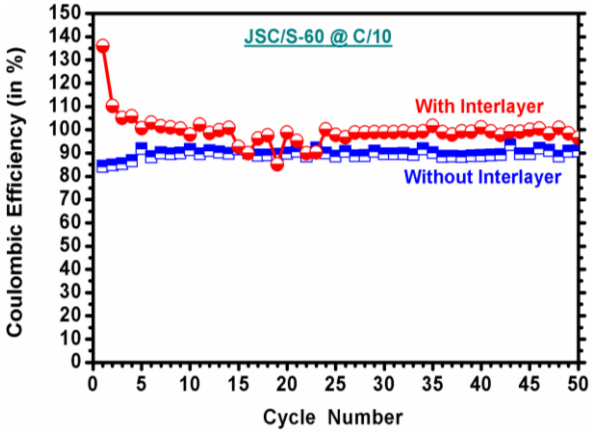


Fig. 2 Role of JSC as an interlayer