

SUPPLEMENTARY DATA

S1. Calculation of Diffusion Coefficient

$$I_p = 2.69 \times 10^5 n^{1.5} A D_{Li^+}^{0.5} C_{Li^+} \nu^{0.5}$$

$$D_{Li^+}^{0.5} = I_p / (2.69 \times 10^5 n^{1.5} A C_{Li^+} \nu^{0.5})$$

I_p is the peak current in ampere.

$$n = 16$$

$$A = 3.14 \times (0.8)^2 \text{ cm}^2$$

$$C_{Li^+} = 0.001 \text{ mol cm}^{-3}$$

$$\nu = 0.1/1000 = 0.0001 \text{ V sec}^{-1}$$

CG cell

Peak 1

$$\begin{aligned} D_{Li^+} &= [0.41 \times 10^{-3} / (2.69 \times 10^5 \times 16^{1.5} \times 2.0096 \times 0.001 \times 0.0001^{0.5})]^2 \\ &= 1.22 \times 10^{-12} \text{ cm}^2 \text{ s}^{-1} \end{aligned}$$

Peak 2

$$\begin{aligned} D_{Li^+} &= [0.62 \times 10^{-3} / (2.69 \times 10^5 \times 16^{1.5} \times 2.0096 \times 0.001 \times 0.0001^{0.5})]^2 \\ &= 3.28 \times 10^{-12} \text{ cm}^2 \text{ s}^{-1} \end{aligned}$$

Peak 3

$$\begin{aligned} D_{Li^+} &= [0.99 \times 10^{-3} / (2.69 \times 10^5 \times 16^{1.5} \times 2.0096 \times 0.001 \times 0.0001^{0.5})]^2 \\ &= 8.22 \times 10^{-12} \text{ cm}^2 \text{ s}^{-1} \end{aligned}$$

ZSC CELL

Peak

$$\begin{aligned}D_{Li^+} &= [1.78 \times 10^{-3} / (2.69 \times 10^5 \times 16^{1.5} \times 2.0096 \times 0.001 \times 0.0001^{0.5})]^2 \\ &= (0.00178 / 345.97)^2 \\ &= 2.64 \times 10^{-11} \text{ cm}^2 \text{ s}^{-1}\end{aligned}$$

Peak 2

$$\begin{aligned}D_{Li^+} &= [2.78 \times 10^{-3} / (2.69 \times 10^5 \times 16^{1.5} \times 2.0096 \times 0.001 \times 0.0001^{0.5})]^2 \\ &= 6.45 \times 10^{-11} \text{ cm}^2 \text{ s}^{-1}\end{aligned}$$

Peak 3

$$\begin{aligned}D_{Li^+} &= [3.03 \times 10^{-3} / (2.69 \times 10^5 \times 16^{1.5} \times 2.0096 \times 0.001 \times 0.0001^{0.5})]^2 \\ &= 7.67 \times 10^{-11} \text{ cm}^2 \text{ s}^{-1}\end{aligned}$$

Peak 4

$$\begin{aligned}D_{Li^+} &= [2.12 \times 10^{-3} / (2.69 \times 10^5 \times 16^{1.5} \times 2.0096 \times 0.001 \times 0.0001^{0.5})]^2 \\ &= 3.75 \times 10^{-11} \text{ cm}^2 \text{ s}^{-1}\end{aligned}$$

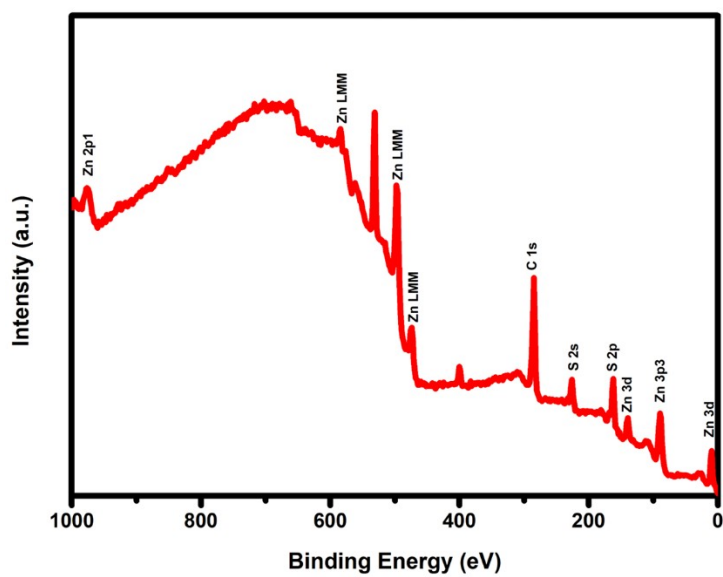


Fig. S2. XPS Survey Spectrum of ZSC

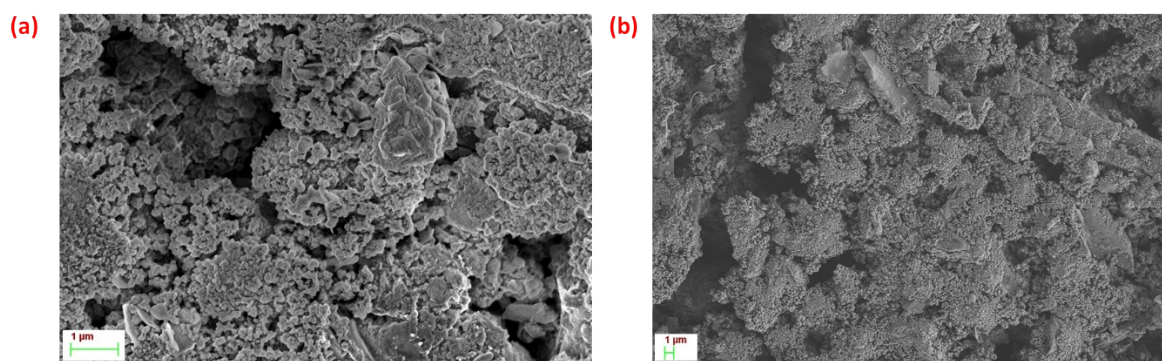


Fig. S3 (a and b): Post-mortem FE-SEM analysis of the ZSC-coated separator after 500 cycles at 0.5 C.