

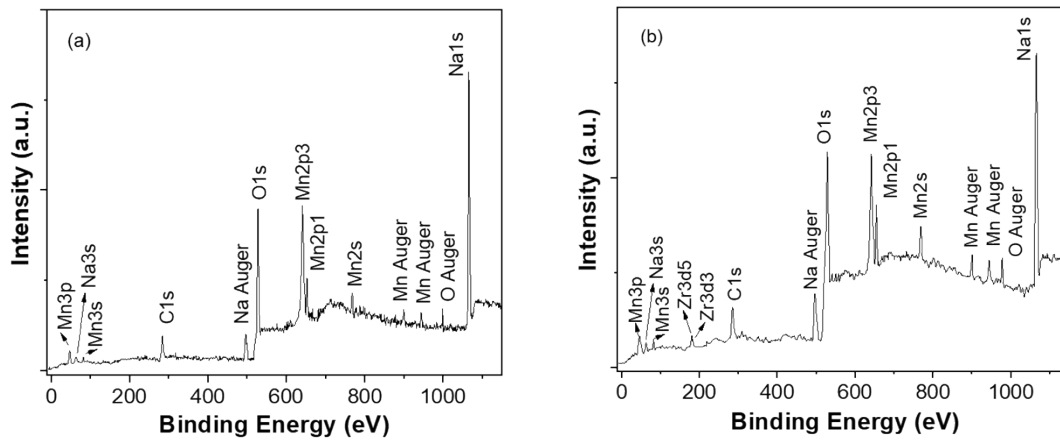
## Supporting Information

### Zr<sup>4+</sup> doped sodium manganese oxide: Enhanced electrochemical performance as cathode in sodium ion battery

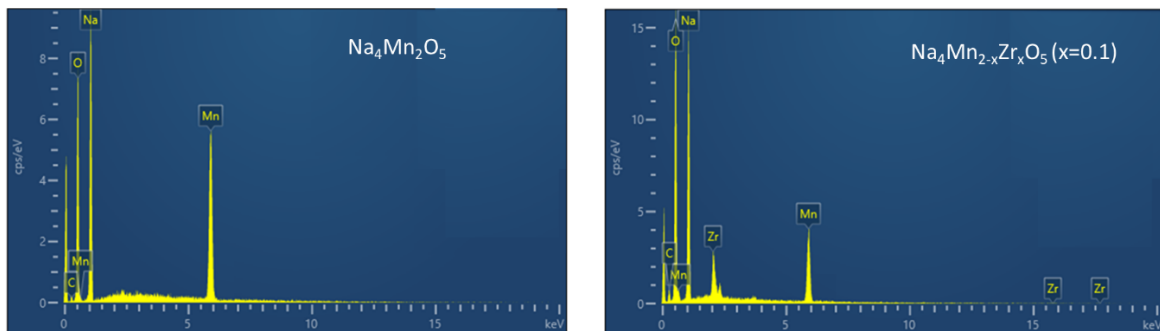
Bristisnata Kashyap<sup>a,b</sup>, Dimple P. Dutta<sup>a,b\*</sup>, B. Modak,<sup>a,b</sup> Sanjay Kumar,<sup>c</sup> Balaji R. Ravuri<sup>d</sup>

**Table S1** Cell parameters of undoped and Zr doped NMO sample obtained from the Rietveld refinement of the XRD data.

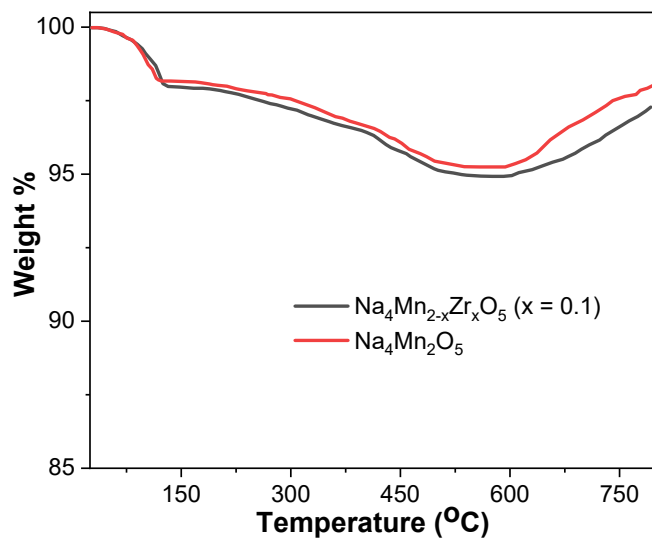
	Undoped NMO		Zr doped NMO	
Space group	F <sub>ddd</sub>	P <sub>mmm</sub>	F <sub>ddd</sub>	P <sub>mmm</sub>
a (Å)	5.710(1)	2.856(2)	5.720(2)	2.855(4)
b (Å)	9.421(2)	6.336(3)	9.451(1)	6.337(1)
c (Å)	19.691(1)	4.788(2)	19.681(3)	4.787(1)
$\alpha$ (°)	90.0000	90.0000	90.0000	90.0000
$\beta$ (°)	90.0000	90.0000	90.0000	90.0000
$\gamma$ (°)	90.0000	90.0000	90.0000	90.0000
R <sub>p</sub> (%)	1.83	1.61	1.91	1.63
R <sub>wp</sub> (%)	1.55	1.35	1.62	1.38
R <sub>exp</sub> (%)	1.62	1.41	1.71	1.44
$\chi^2$	1.69	1.18	1.76	1.22



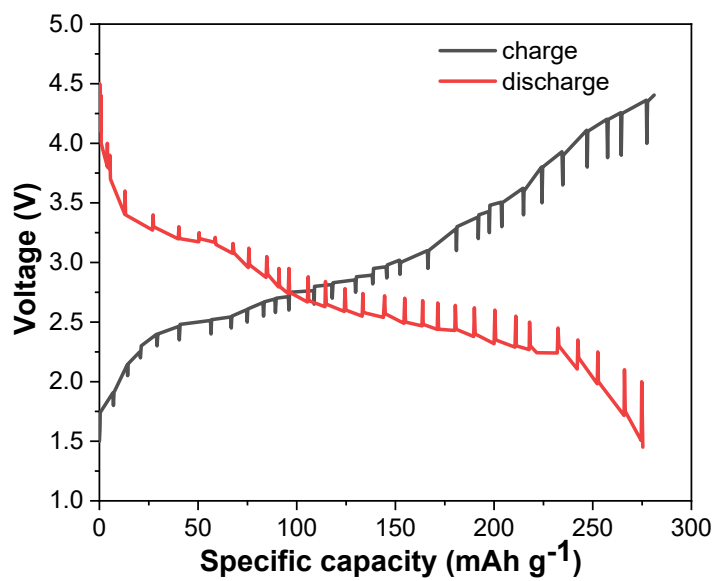
**Figure S1:** XPS survey spectrum of (a)  $\text{Na}_4\text{Mn}_2\text{O}_5$  and (b)  $\text{Na}_4\text{Mn}_{2-x}\text{Zr}_x\text{O}_5$  ( $x=0.1$ ).



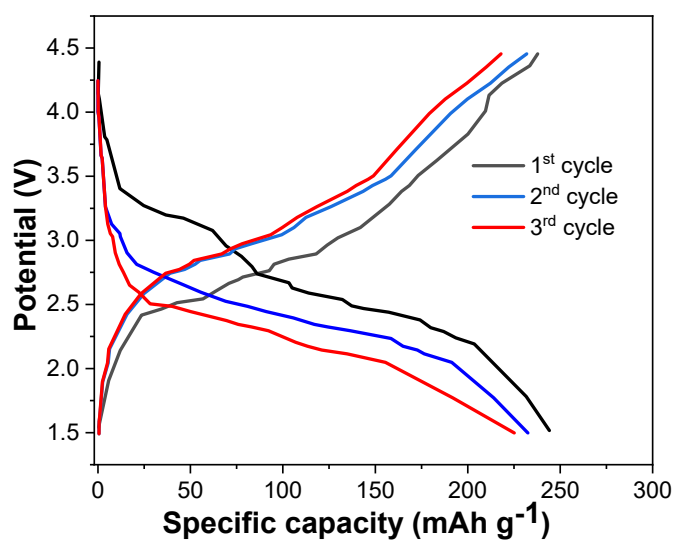
**Figure S2:** EDS plot of  $\text{Na}_4\text{Mn}_2\text{O}_5$  and  $\text{Na}_4\text{Mn}_{2-x}\text{Zr}_x\text{O}_5$  ( $x=0.1$ ).



**Figure S3:** TGA plots of  $\text{Na}_4\text{Mn}_2\text{O}_5$  and  $\text{Na}_4\text{Mn}_{2-x}\text{Zr}_x\text{O}_5$  ( $x=0.1$ ).



**Figure S4:** GITT plot of  $\text{Na}_4\text{Mn}_{2-x}\text{Zr}_x\text{O}_5$  ( $x=0.1$ ) at current rate of  $15 \text{ mA g}^{-1}$ .



**Figure S5:** GDC plot of  $\text{Na}_4\text{Mn}_2\text{O}_5$

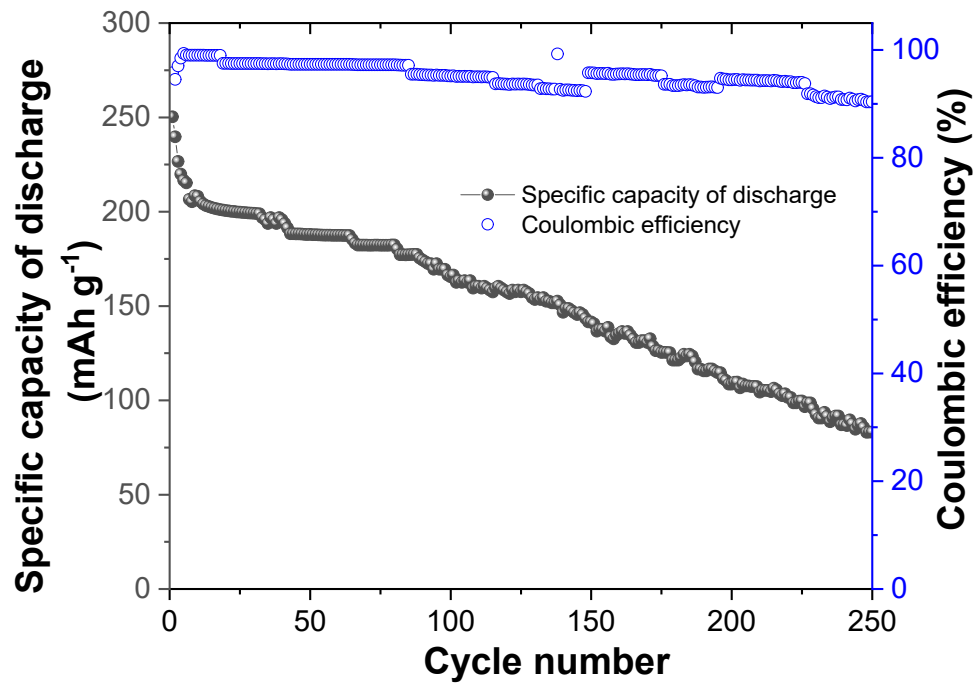


Figure S6: Cycling plot at 0.05 A g<sup>-1</sup> current density of Na<sub>4</sub>Mn<sub>2</sub>O<sub>5</sub>.