Electronic Supplementary Material (ESI) for Nanoscale.

[Electronic Supplementary Information]

Bi-MOF derived micro/meso-porous Bi@C nanoplates for high performance lithium-ion batteries

Min-Kun Kim‡, Min-Seob Kim‡, Jae Hyuk Park, Jin Kim, Chi-Yeong Ahn, Aihua Jin, Junyoung Mun* and Yung-Eun Sung*

‡These authors contributed equally to this work

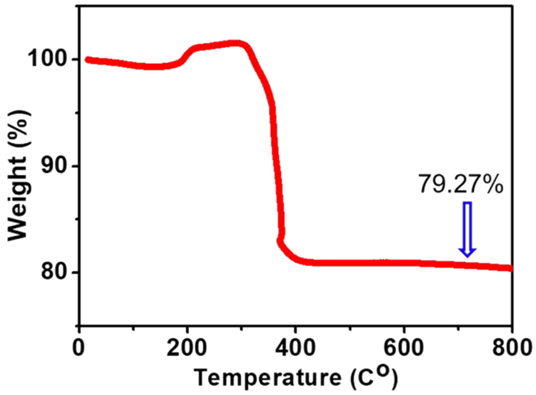
*** To whom correspondence should be addressed:**

Corresponding authors. Email: ysung@snu.ac.kr (Y.-E.S.); jymun@inu.ac.kr (J.M.)

This file includes:

Figures S1 to S10

Table S1



$$\text{Bi(wt \%)}=100\times\frac{Molecular\ weight\ of\ Bi\times 2}{Molecular\ weight\ of\ Bi_2O_3}\times\frac{Final\ weight\ of\ Bi_2O_3}{Initial\ weight\ of\ Bi/C}=71.7\ \%$$

Molecular weight of Bi : 208.98 g mol^{-1}

Molecular weight of Bi_2O_3 : 465.957 g mol^{-1}

Final weight of Bi_2O_3 : 3.183753 g

Initial weight of Bi/C : 3.983276 g

Fig. S1 Weight ratio measurement analysis of Bi@C by TGA

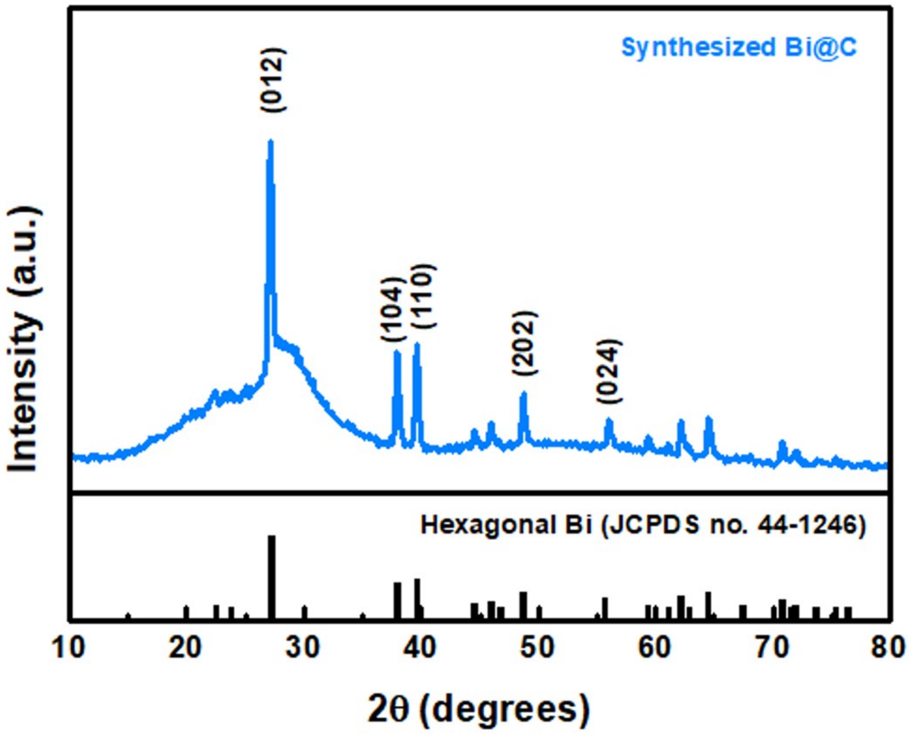


Fig. S2 XRD patterns of Bi@C

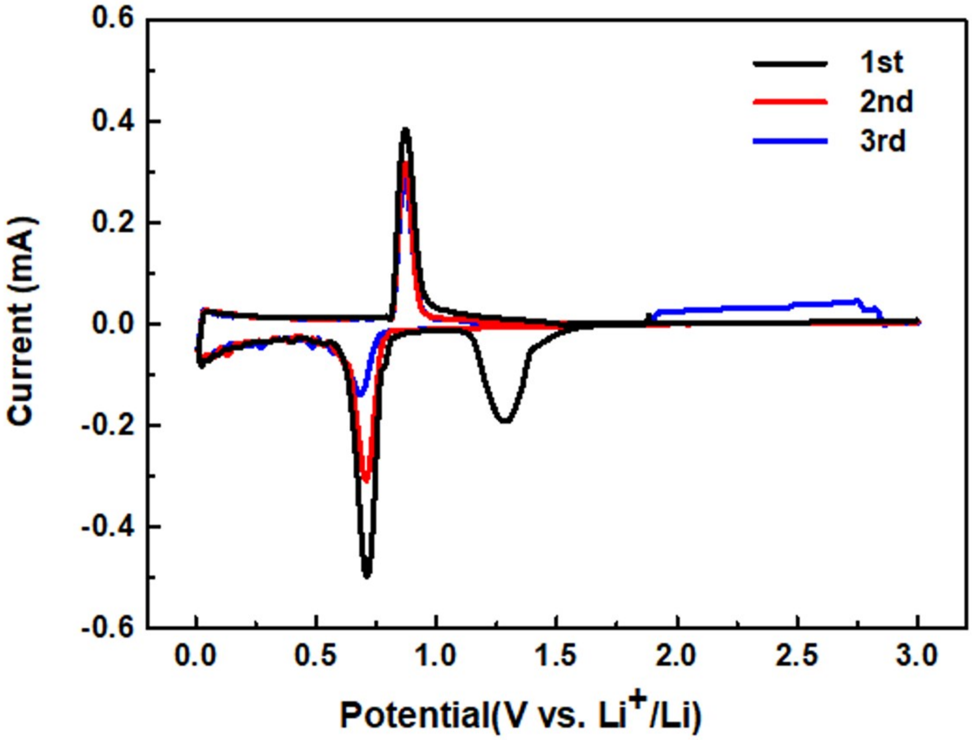


Fig. S3 Electrochemical performance of CV profiles of Bi commercial for the first three cycles at a scan rate of 0.1 mV s^{-1}.

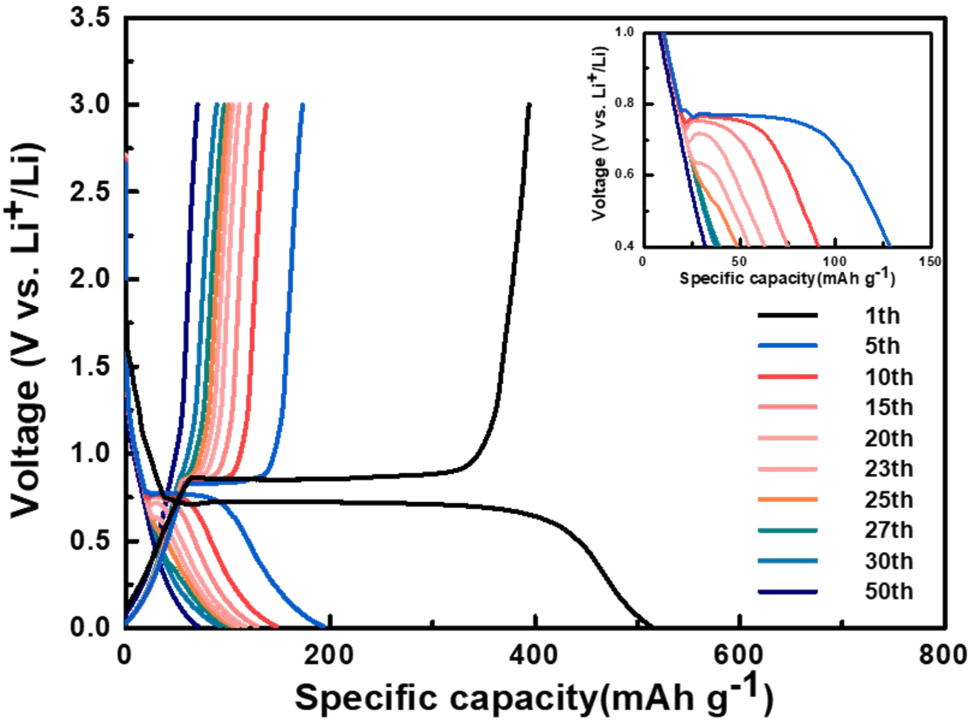


Fig. S4 Charge and discharge potential curves of Bi commercial at a current density of 100 mA g^{-1}.

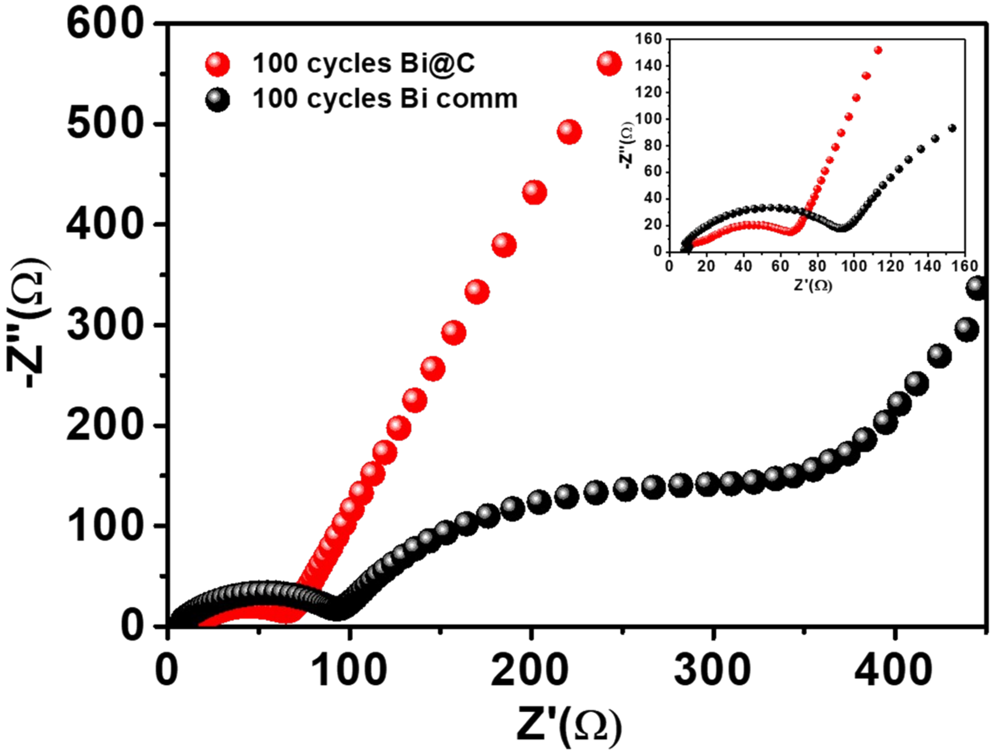


Fig. S5 EIS analysis of Bi@C and Bi commercial measured after 100 cycles.

Materials	Current density ($mA\ g^{-1}$)	Cycle numbers	Capacity ($mAh\ g^{-1}$)	References
Nanostructured bismuth-based composites	100	100	300	*J. Power Sources*, 2009, **186**, 206
Bismuth/CNF anodes	100	200	484	*Nanoscale*, 2017, ***9**, 13298*
Bi@C core-shell nanowires	100	100	408	*Nanoscale*, 2014, **6**, 13236
Bi@C nanoplates	150	150	605	*ChemistrySelect*, 2018, **3**, 8973
Bi Nanoparticles anchored in N-doped porous carbon	80	100	285	*Nano-Micro Lett.*, 2018, **10**, 56,
N-doped graphene/Bi nanocomposites	50	10	390	*Ionics*, 2017, **23**, 1407
Micro/meso-porous Bi@C nanoplates	100	100	556	This work

Table S1. Comparison of Li storage performance on recent Bi@C composites

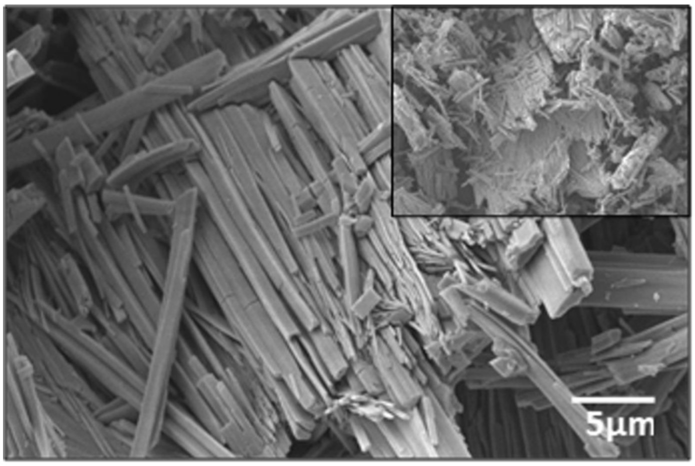


Fig S6. SEM images of Bi-MOF after microwave-assisted hydrothermal method

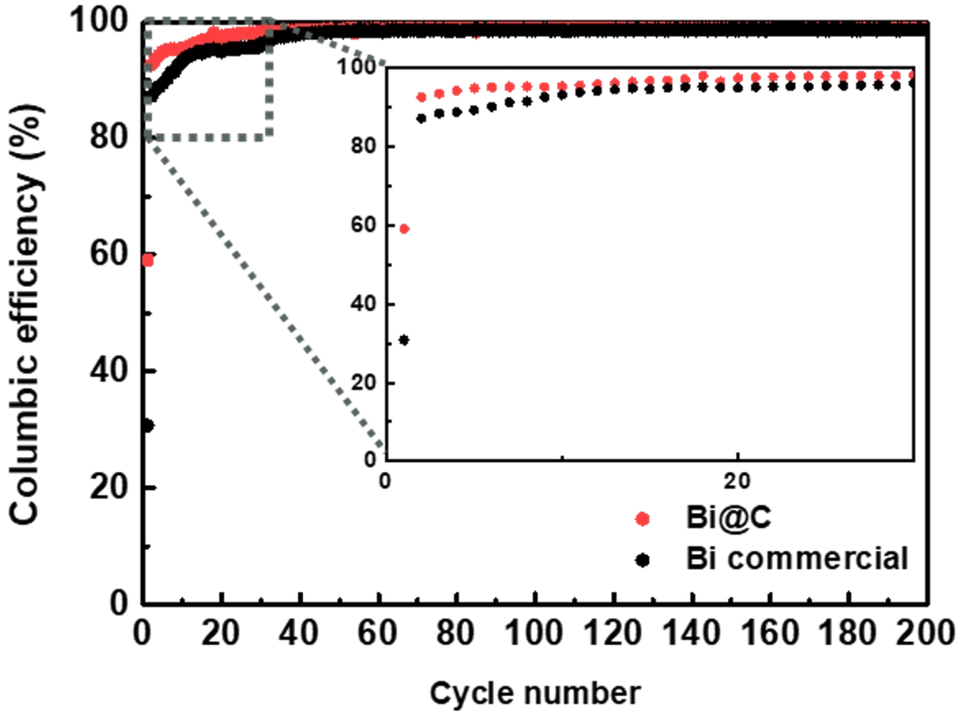


Fig. S7 Coulombic efficiency of Bi@C and Bi commercial calculated from Fig. 3c

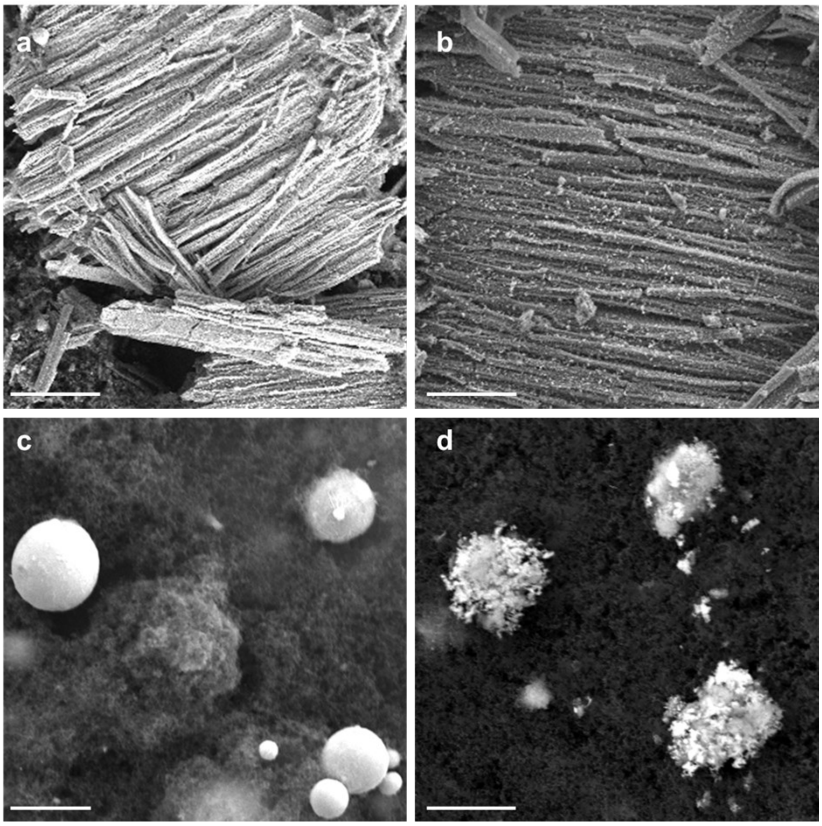


Fig. S8 SEM images of Bi@C electrode (a) pristine (b) after 20 cycles and Bi commercial electrode (c) pristine (d) after 20 cycles (scale bar = 10 μm)

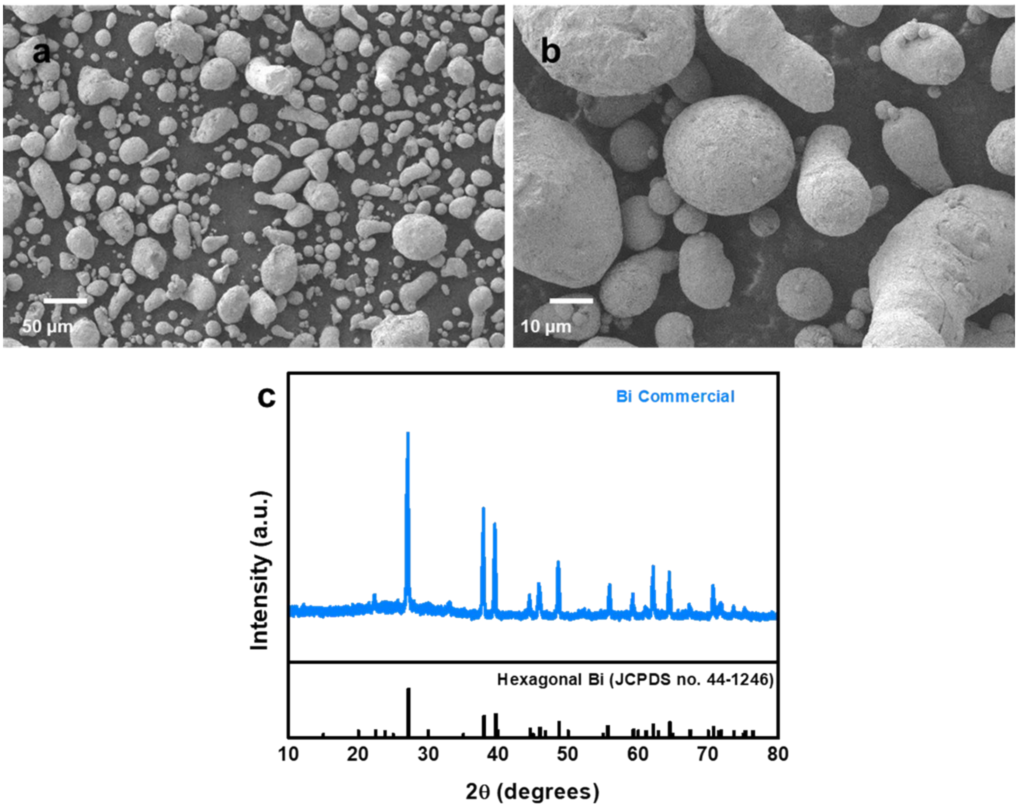


Fig. S9 (a,b) SEM images and (c) XRD patterns of Bi commercial

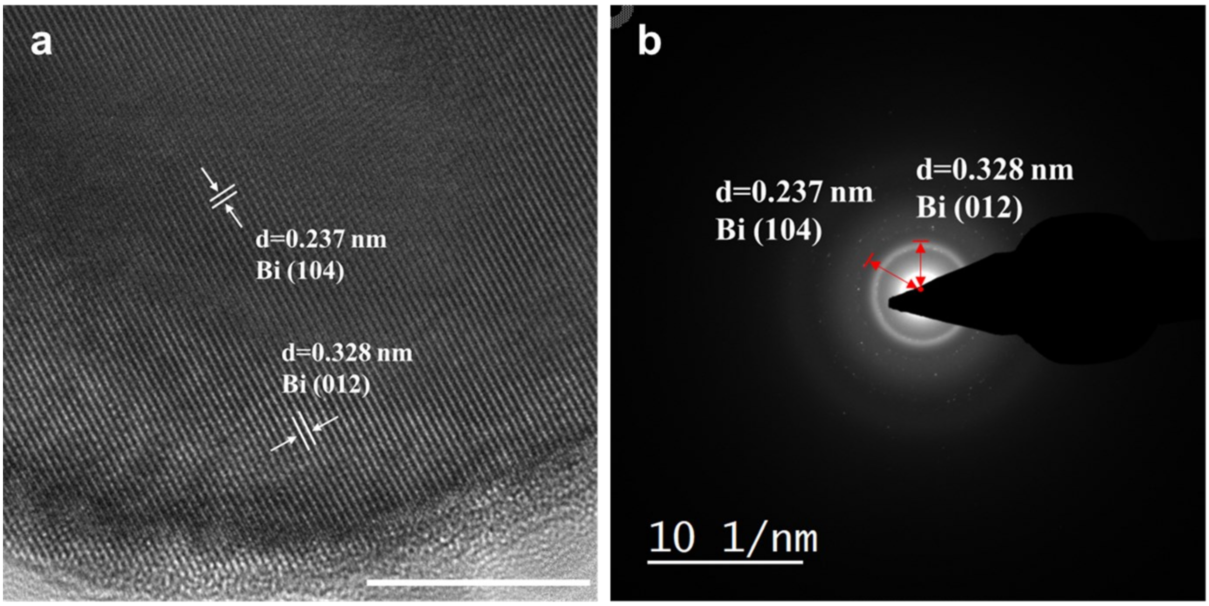


Fig. S10 (a) TEM images and (b) SAED pattern of Bi@C (scale bar =10 nm)