Supporting Information

Superior Na-Ion Storage Properties of High Aspect Ratio SnSe Nanoplates Prepared by Spray Pyrolysis Process

Gi Dae Park, Jong-Heun Lee, and Yun Chan Kang*

Department of Materials Science and Engineering, Korea University, Anam-dong, Seongbuk-gu, Seoul 136-713, Republic of Korea

E-mail: yckang@korea.ac.kr Fax: +82-2-928-3584; Tel: +82-2-3290-3268

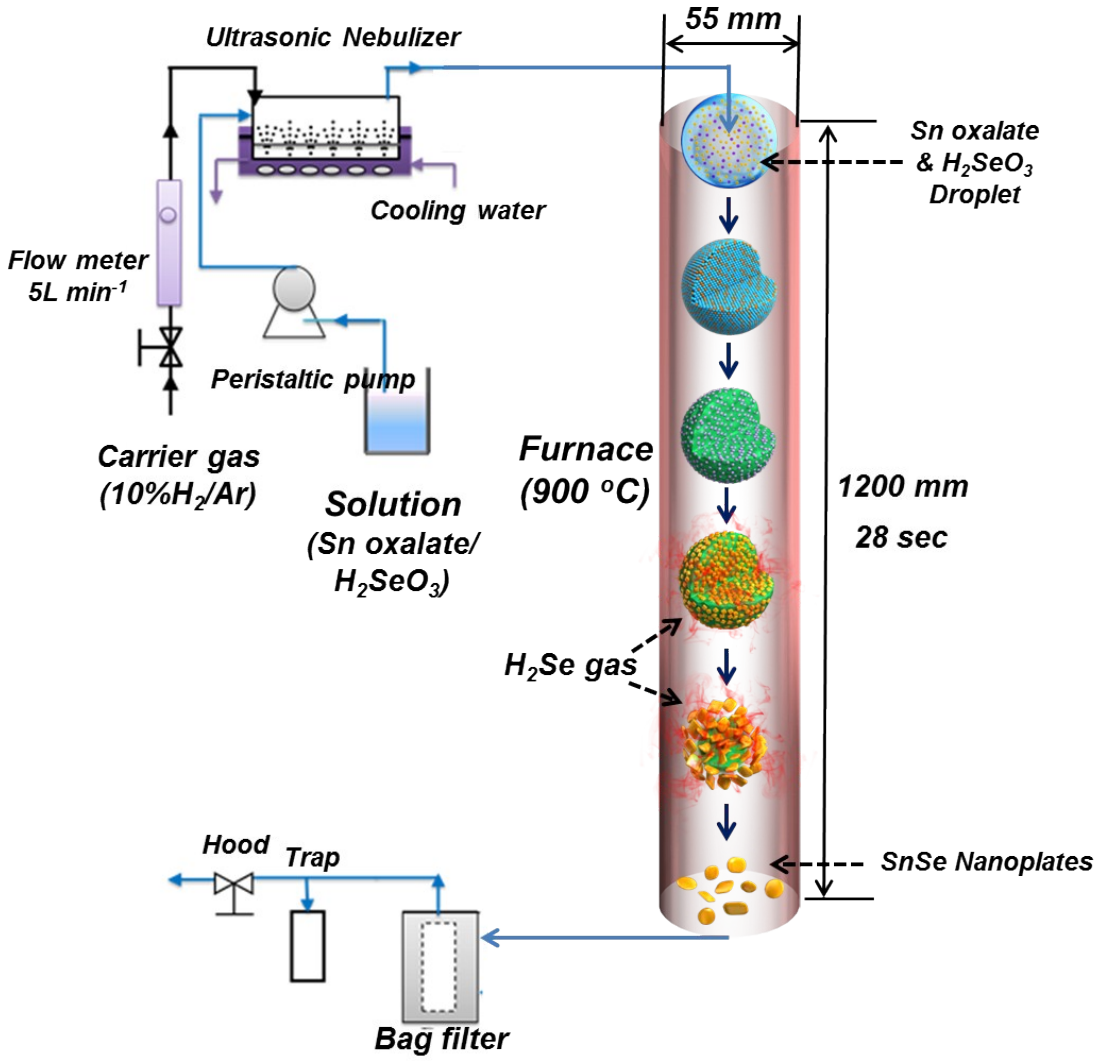

Fig. S1 Schematic diagram of the spray pyrolysis system for the SnSe nanoplate powders.

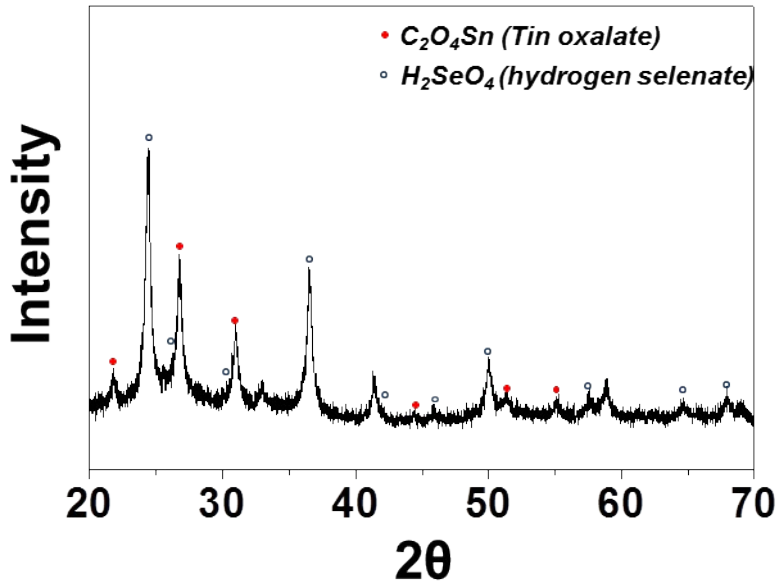

Fig. S2 XRD pattern of the powders formed prior to the reactor in spray pyrolysis process at 200 ^{o}C from the spray solution with 400 % of the stoichiometric SeO_2 content required to form SnSe.

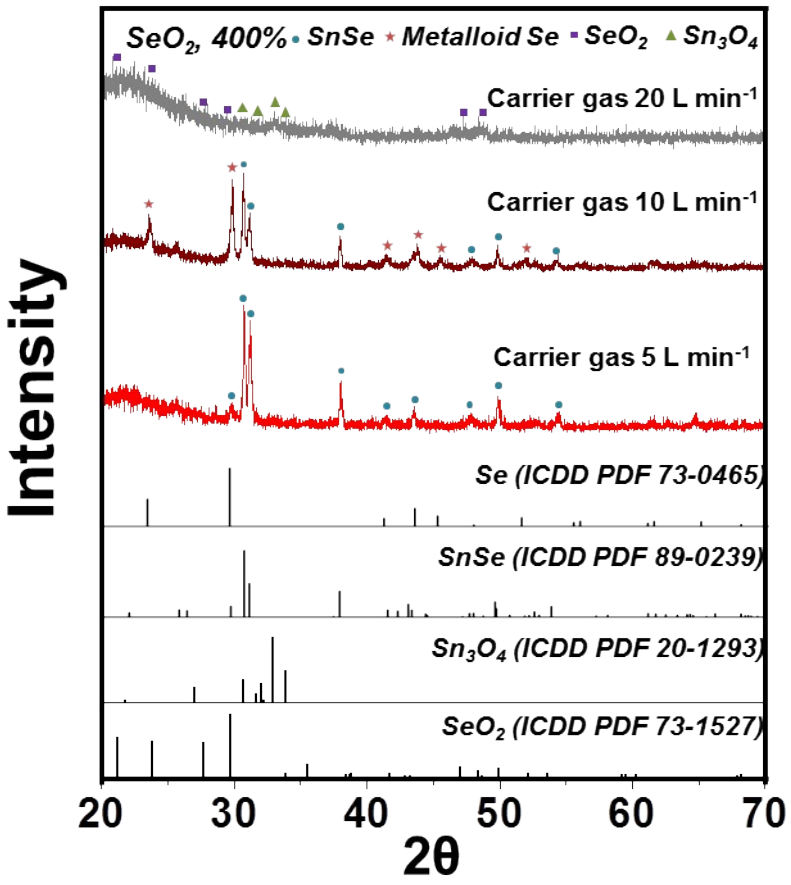

Fig. S3 XRD patterns of the powders prepraed by one-pot spray pyrolysis at 900 °C from the spray solution with 400 % of the stoichiometric SeO_2 content required to form SnSe at various flow rates of the carrier gas.

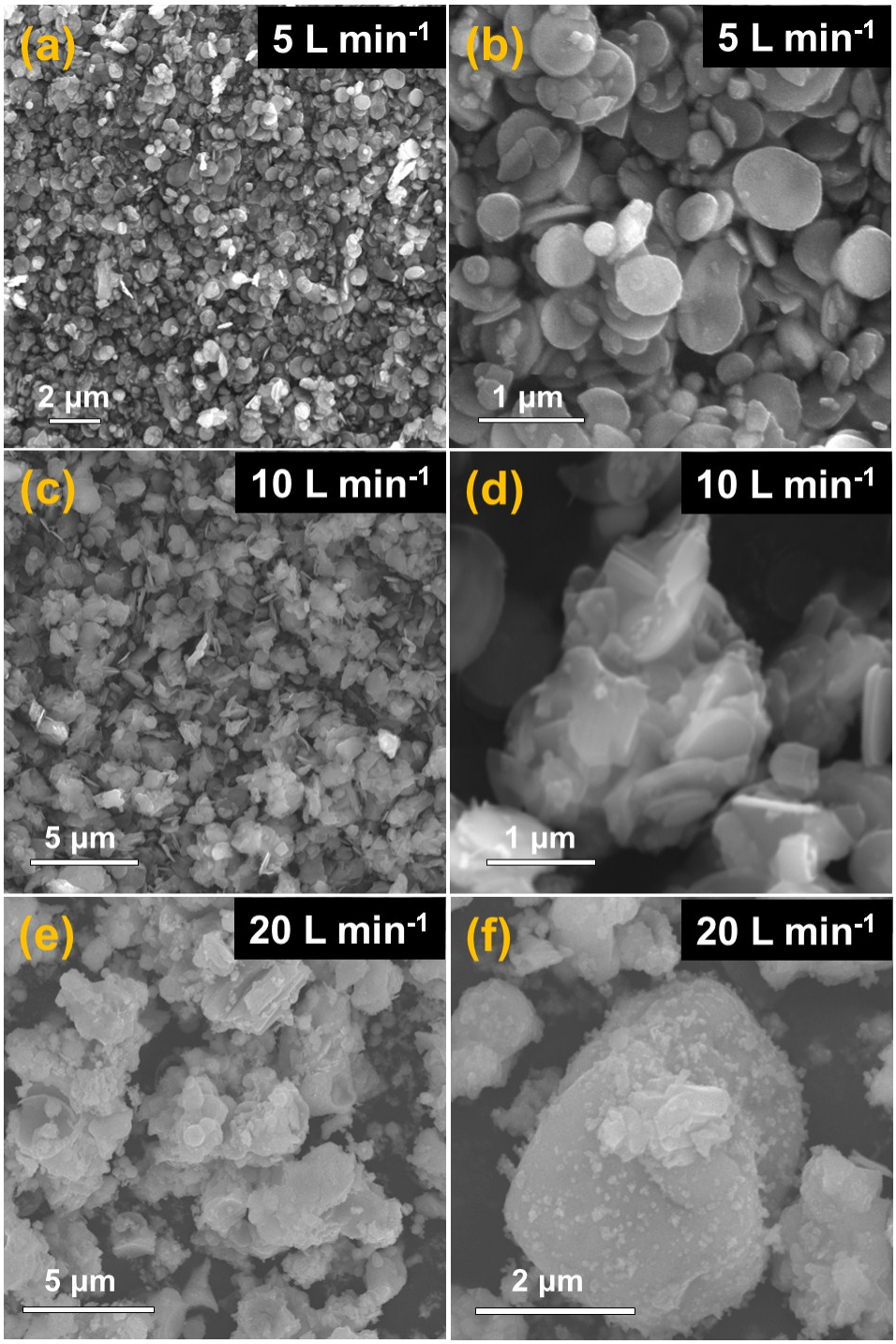

Fig. S4 Morphologies of the powders prepared by one-pot spray pyrolysis at 900 °C from the spray solution with 400 % of the stoichiometric SeO_2 content required to form SnSe at various flow rates of the carrier gas: (a) and (b) 5 L min^{-1}, (c) and (d) 10 L min^{-1}, and (e) and (f) 20 L min^{-1}.

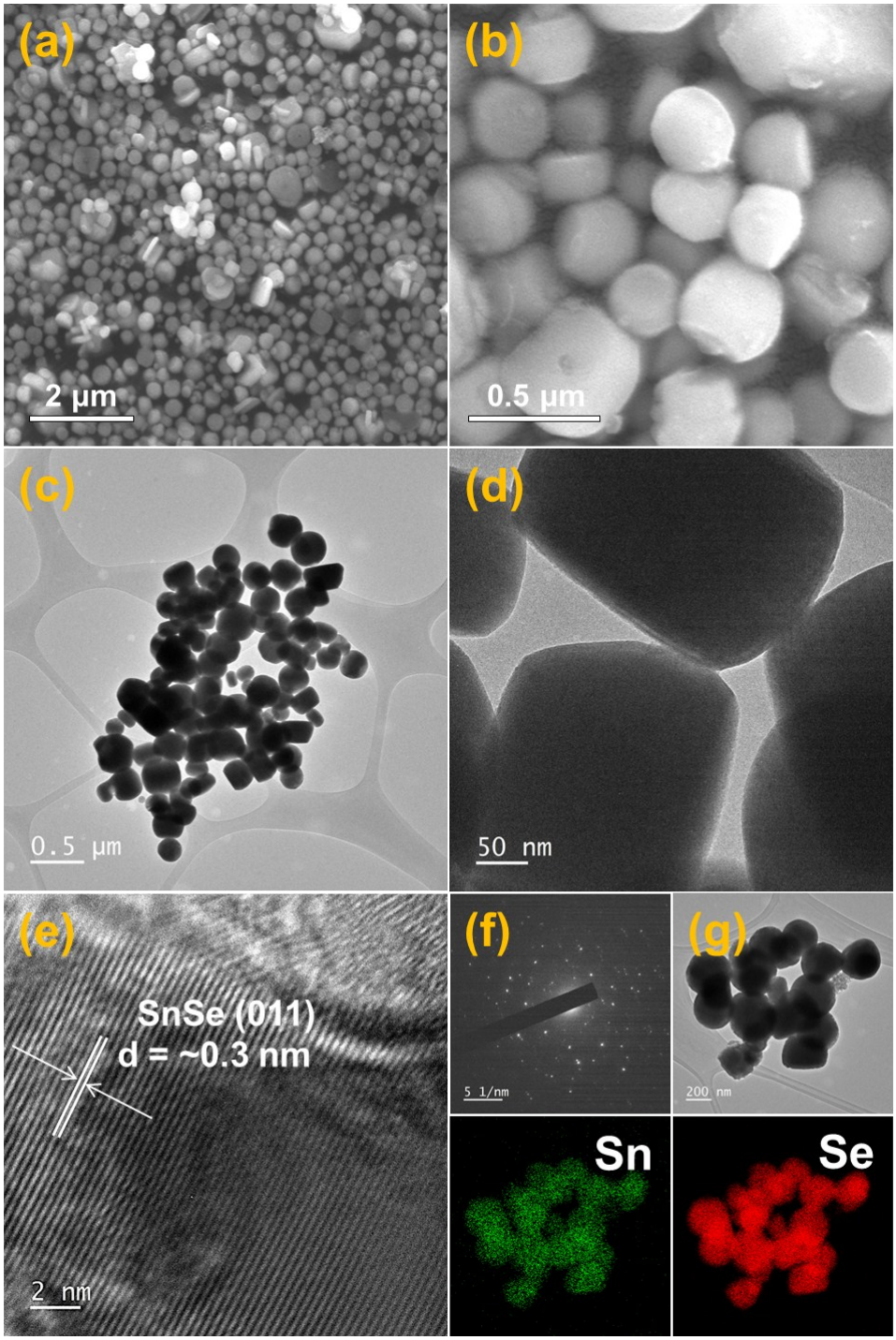

Fig. S5 Morphologies of the SnSe nanoplates prepared from the spray solution with 100 % of the stoichiometric SeO_2 content required to form SnSe at 900 °C: (a) and (b) SEM images, (c) and (d) TEM images, (e) HR-TEM image, (f) SAED pattern, and (g) elemental mapping images.

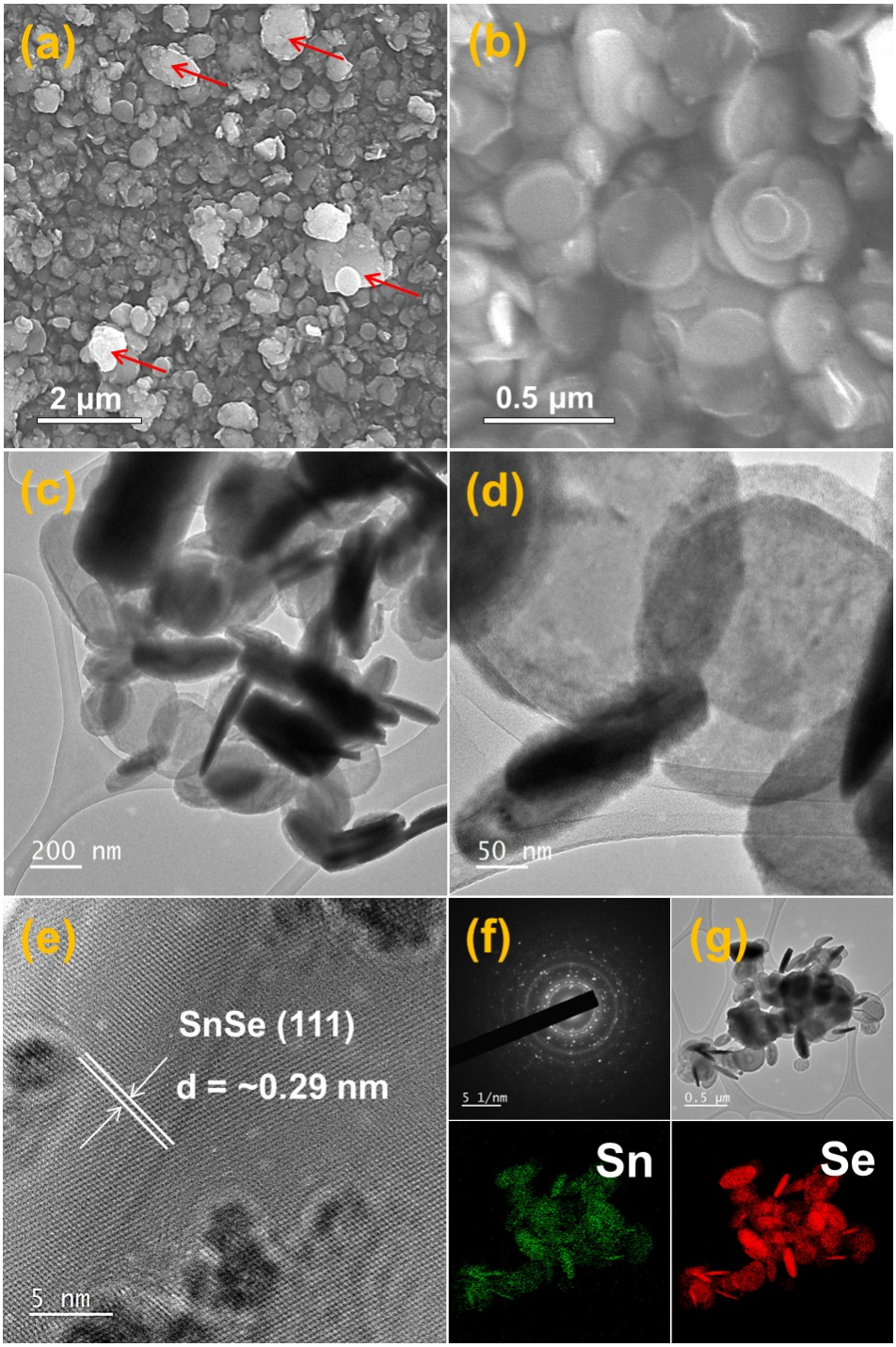

Fig. S6 Morphologies of the SnSe nanoplates prepared from the spray solution with 800 % of the stoichiometric SeO_2 content required to form SnSe at 900 °C: (a) and (b) SEM images, (c) and (d) TEM images, (e) HR-TEM image, (f) SAED pattern, and (g) elemental mapping images.

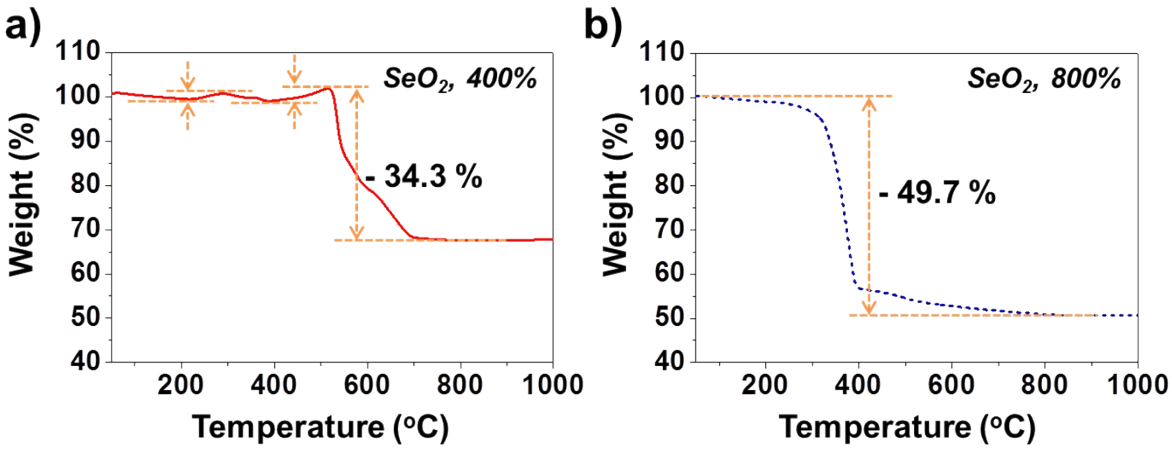

Fig. S7 TG analysis of the powders prepared by one-pot spray pyrolysis at 900 °C from the spray solution with (a) 400 and (b) 800 % of the stoichiometric SeO_2 content required to form SnSe.

Table S1. Sodium ion storage properties of various tin selenide materials.

Tin selenide	Synthesis	Electrochemical properties	Ref
SnSe/carbon nanocomposite	Ball milling	325 mA h g^{-1} after 200 cycles at 0.5 A g^{-1}	[24]
SnSe alloy	Ball milling	272 mA h g^{-1} after 50 cycles at 0.2 A g^{-1}	[38]
SnSe/ reduced graphene oxide	Ball milling	570 mA h g^{-1} after 50 cycles at 0.1 A g^{-1}	[39]
$SnSe_x$ flowerlike composites	Solvothermal method	272 mA h g^{-1} after 50 cycles at 0.2 A g^{-1}	[40]
SnSe nanoplates	Spray pyrolysis	558 mA h g^{-1} after 50 cycles at 0.3 A g^{-1}	**This work**