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Supporting Information

SnSe alloy as a promising anode material for Na-ion batteries

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Experimental

1. Material preparation

Tin selenide powder (Aldrich, 99.995 %), Super P and 5 mm zirconia balls with a ball-to-powder ratio of 10:1 by weight were put into zirconia bowl. The molar ratio of SnSe and Super P powders used 7:3, respectively. Blending process was performed by planetary ball milling (Pulverisette 7) at 300 rpm for 3 hours in Ar atmosphere.

2. Material characterization

Powder X-Ray diffraction (XRD) data were recorded using a Rigaku D/MAX2500V/PC

powder diffractometer (Cu-Kα radiation, λ = 1.5405 Å) operated from 2θ = 10~80° at 40 kV and 200 mA. The morphology of sample was examined in a field-emission scanning electron microscopy (FE-SEM, Hitachi, S-4800)

3. Electrochemical characterization

Slurry of 70 wt. % SnSe/C composites, 10 wt. % conducting agent (Super P), and 20 wt. % polyacrylic acid (PAA) was cast on aluminum foil. The electrodes were dried at 120^{o}C on a vacuum oven overnight. The mass loading of the electrodes is ca. 1~2 mg cm^{-2}. The electrochemical characteristics were evaluated using 2032 coin cells with a Na metal anode and 1 *M* $NaClO_4$ (Aldrich, ≥ 98 %) in ethylene carbonate and diethyl carbonate (1:1 v/v, PANAX ETEC Co., Ltd., Korea) electrolyte solution with addition of 3 wt. % fluoroethylene carbonate (FEC, Soulbrain Co. Ltd.). Galvanostatic experiments were carried out between 0.0 and 2 V (*vs.* Na / Na^+) at a current density of 144 mA g^{-1} using WBCS 3000 (WonATech, Korea) under room temperature.

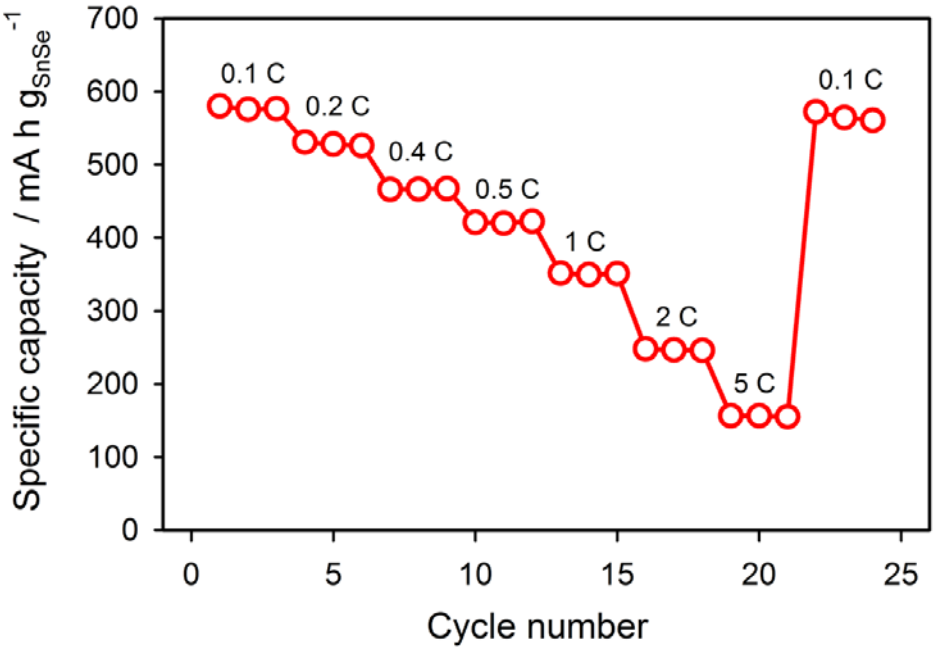

Figure S1. Rate performance of SnSe/C composites. (0.1 C = 77 mA g^{-1})