Supplementary Information

**Fast, green microwave-assisted synthesis of single crystalline Sb2Se3 nanowires towards promising lithium storage**

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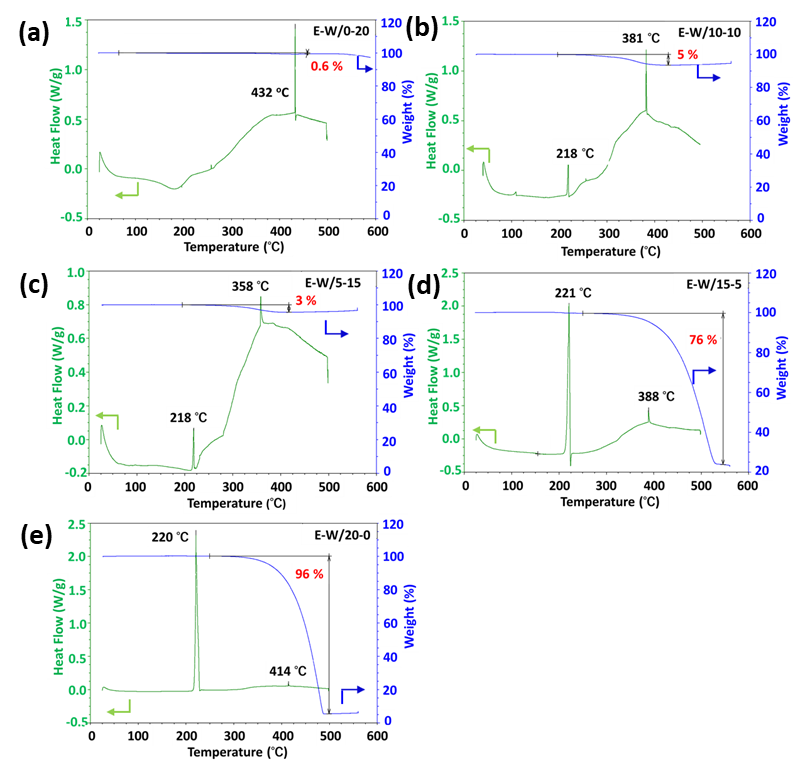
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**Table S1.** Comparison of method, reducing agent, incubation time with previously published reports on Sb2Se3 *via* wet chemical approaches. Our method features high-quality (uniform ultralong nanowires with high yield), greener reducing agent and much shorter reaction time.

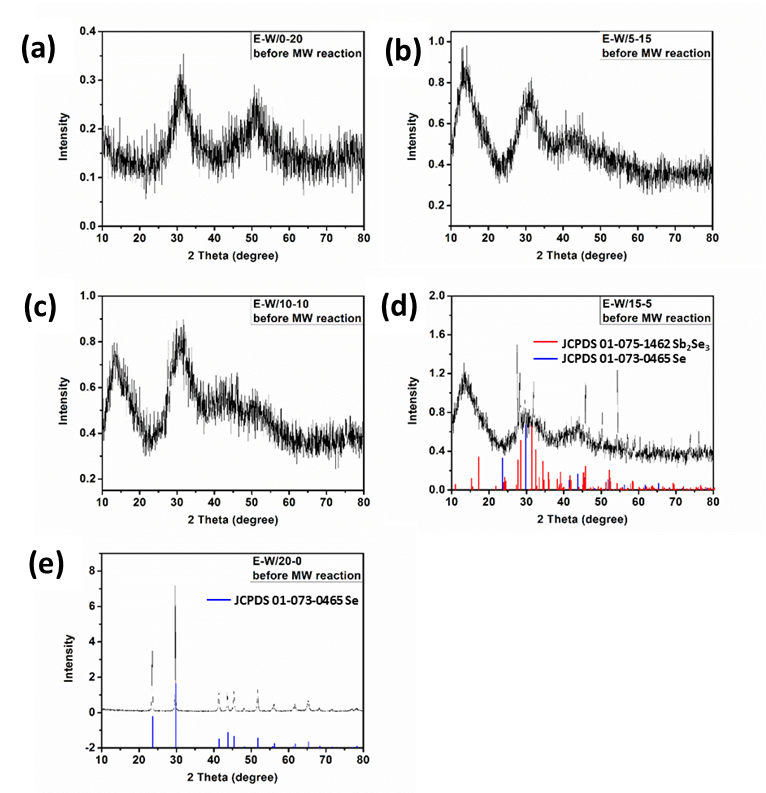
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| --- | --- | --- | --- |
| **Sample** | **Method** | **Reducing**  **agent** | **Incubation time** |
| **Sb2Se3 nanowires**  **(This work)** | **Microwave synthesis** | **NaBH4** | **0.5 h** |
| Sb2Se3 submicron spheres[1] | Microwave synthesis | ethylene glycol | 0.5 h |
| Sb2Se3 nanorods[2] | Microwave synthesis | glycerol | 0.5 h |
| Sb2Se3 nanowires[3] | Microwave synthesis | oleylamine | 1 h |
| Sb2Se3 nanowires[4] | Solvothermal synthesis | benzyl alcohol | 24 h |
| Sb2Se3 nanoribbons[5] | Hydrothermal reaction | NaBH4 | 72 h |
| Sb2Se3 micro sheaf-like[6] | Hydrothermal reaction | NaBH4 | 12 h |
| Sb2Se3 hierarchical sphere[7] | Solvothermal synthesis | ethanediamine | 18 h |
| Sb2Se3 nanoplates[8] | Solvothermal synthesis | N2H4·H2O +tetrahydrofuran | 9 h |
| Sb2Se3 nanosheets[9] | Solvothermal synthesis | N2H4·H2O  +tetrahydrofuran | 9 h |
| Sb2Se3 nanowires[10] | Solvothermal synthesis | oleylamine | 32 h |
| Sb2Se3 nanorods/nanowires[11] | Hydrothermal reaction | N2H4·H2O | 24 h |
| Sb2Se3 nanowires[12] | Hydrothermal reaction | NaBH4 | 72 h |
| Sb2Se3 nanobelts[13] | Hydrothermal reaction | N2H4·H2O | 18 h |
| Sb2Se3 nanowires[14] | Hydrothermal reaction | N2H4·H2O | 36 h |

**Table S2.** pH value of mixture solutions at interval state: 1) SbCl3, Na2SeO3 dissolved in different volume ratio of EG and H2O and 2) after adding NaBH4 and stirring until totally dissolve.

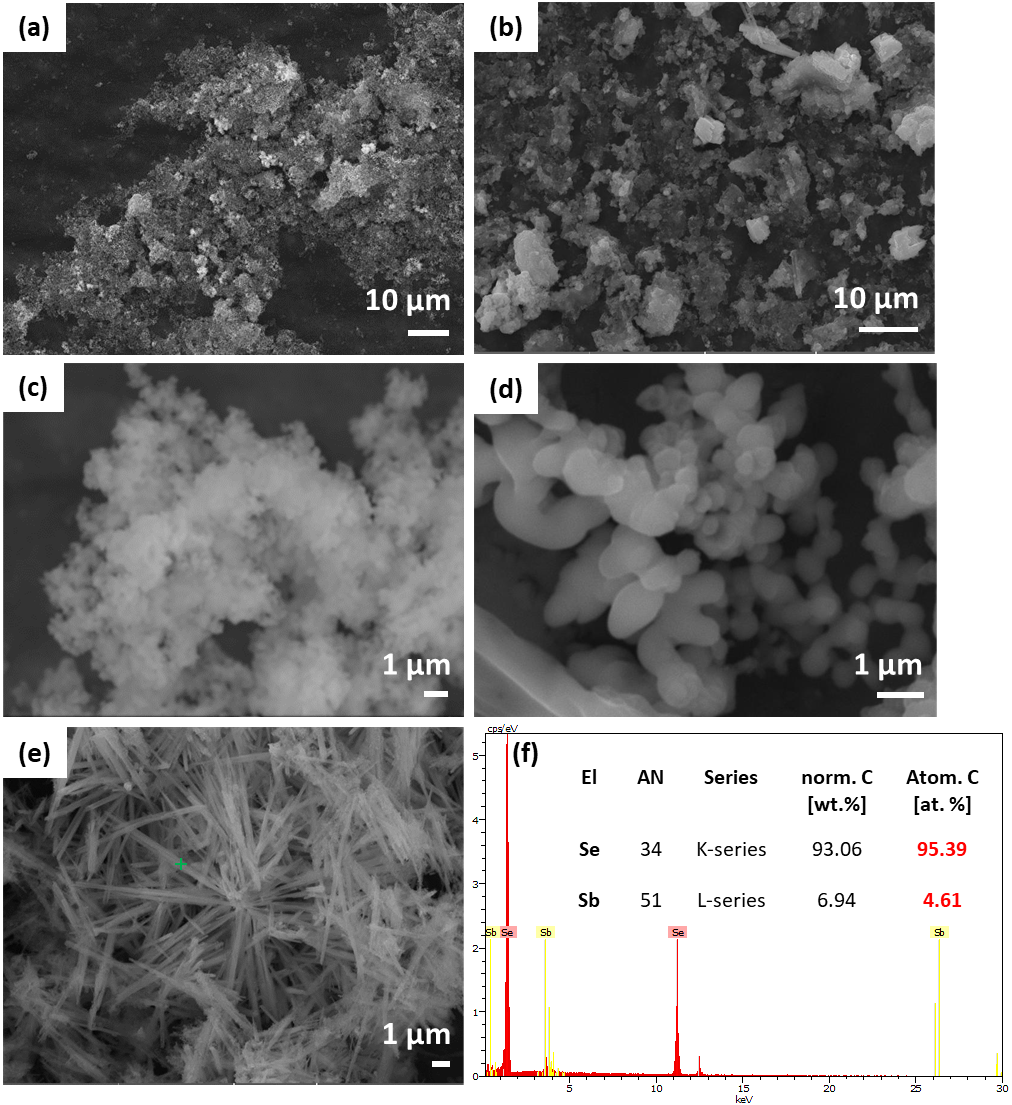
|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **pH**  **(E0)** | **pH**  **(E5)** | **pH**  **(E10)** | **pH**  **(E15)** | **pH**  **(E20)** |
| 1) After dissolving SbCl3 and Na2SeO3 in mixture EG/H2O solvent | 2.5 | 2.4 | 2.3 | 2.5 | 2.1 |
| 2) After adding NaBH4 | 10.2 | 9.3 | 8.4 | 5.7 | 4.8 |

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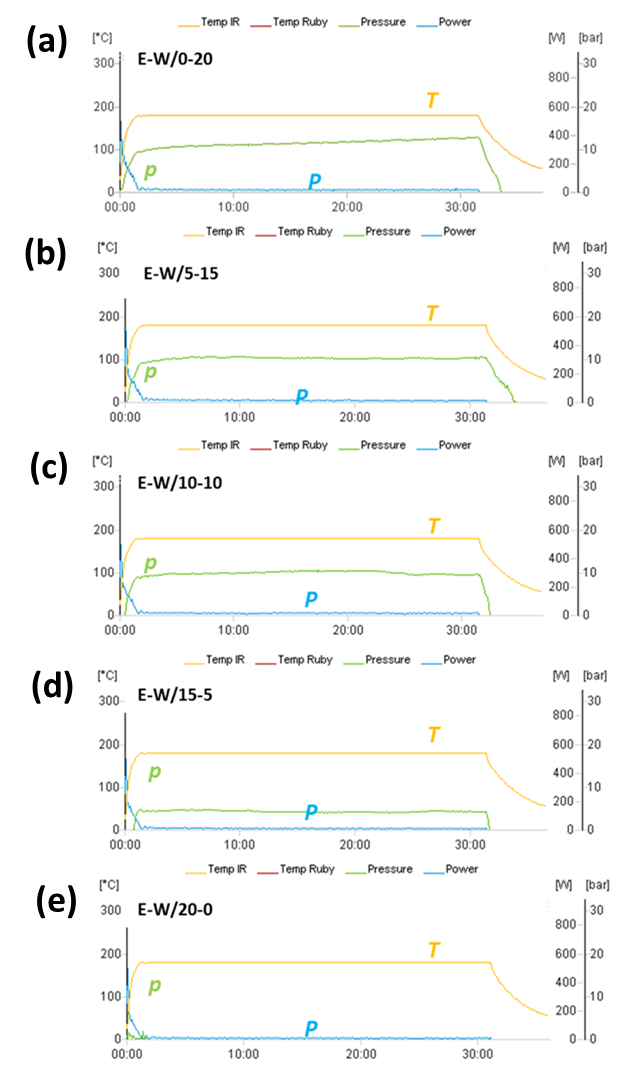
**Fig. S1** TGA profiles and corresponding DSC curves of (a) sample E0, (b) sample E5, (c) sample E10, (d) sample E15 and (e) sample E20.



**Fig. S2** XRD patterns of the intermediate products obtained with 3 h constant stirring reaction at room temperature before microwave heating (SbCl3, Na2SeO3 and NaBH4 dissolved in mixture solution of different volume ratio of EG and H2O): (a) EG 0 mL + H2O 20 mL; (b) EG 5 mL + H2O 15 mL; (c) EG 10 mL + H2O 10 mL; (d) EG 15 mL + H2O 5 mL; (e) EG 20 mL + H2O 0 mL).



**Fig. S3** SEM images of the intermediate products obtained with 3 h constant stirring reaction at room temperature before microwave heating (SbCl3, Na2SeO3 and NaBH4 dissolved in mixture solution of different volume ratio of EG and H2O): (a) EG 0 mL + H2O 20 mL; (b) EG 5 mL + H2O 15 mL; (c) EG 10 mL + H2O 10 mL; (d) EG 15 mL + H2O 5 mL; (e) EG 20 mL + H2O 0 mL). (f) EDX spectrum corresponds to green point area in Fig. S3(e).



**Fig. S4** The detailed parameters of power, temperature and pressure during whole microwave irradiation: (a) sample E0, (b) sample E5, (c) sample E10, (d) sample E15 and (e) sample E20

**References in Supporting Information**

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