Supplementary Information

Improved Sodium-Ion Storage Properties by Fabricating Nanoporous CuSn Alloy Architecture

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Fig. S1 The XRD pattern of CuSnAl alloy precursor.

Fig. S2 Morphological characterizations of CuSn anodes: SEM image of CuSnAl alloy precursor (a), CS12 (b) and CS48 (c).
Fig. S3 TEM images of CS24 nanoporous composites at different magnifications.

Fig. S4 The N\textsubscript{2} adsorption-desorption isotherms of (a) CS12, (b) CS24 and (c) CS48.
Fig. S5 Galvanostatic discharge/charge curves for CS12, CS24, CS48 electrodes of the first cycle at a current density of 50 mA g\textsuperscript{-1}.

Fig. S6 Cycling performance comparison of pure Sn, CS12, CS24 and CS48 electrodes at a density
Fig. S7 Galvanostatic discharge/charge curves of CS24 at a current density of 50 mA g\(^{-1}\).
Fig. S8. SEM image of SnAl alloy precursor: (a) before etching, (b) after etching 24h. (c) XRD patterns of SnAl-24, (d) Nquist plots of SnAl-24 and CS24 after the initial formation cycle.

Fig. S9 SEM image of CS24 electrode after 100 discharge/charge cycles at a current density of 50 mA g⁻¹.
Fig.S10 Low-magnification TEM images of CSA24 electrode after the first discharged to 0.05 V cycles at a current density of 50 mA g\textsuperscript{-1}.

Fig.S11 Electrochemical impedance spectroscopy (EIS) of CSA24 electrodes for fresh, after 1st and 10st cycled in the frequency range 100000 Hz to 0.01 Hz at 5 mV amplitude.
Table S1 The compositions of CSA and various CuSn samples (CS12, CS24, CS48).

<table>
<thead>
<tr>
<th></th>
<th>CSA (Cu₂Sn₃Al)</th>
<th>CS12</th>
<th>CS24</th>
<th>CS48</th>
</tr>
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<tbody>
<tr>
<td>Cu₂Sn (molar ratio)</td>
<td>17: 7: 76</td>
<td>47: 41</td>
<td>54: 37</td>
<td>57: 35</td>
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