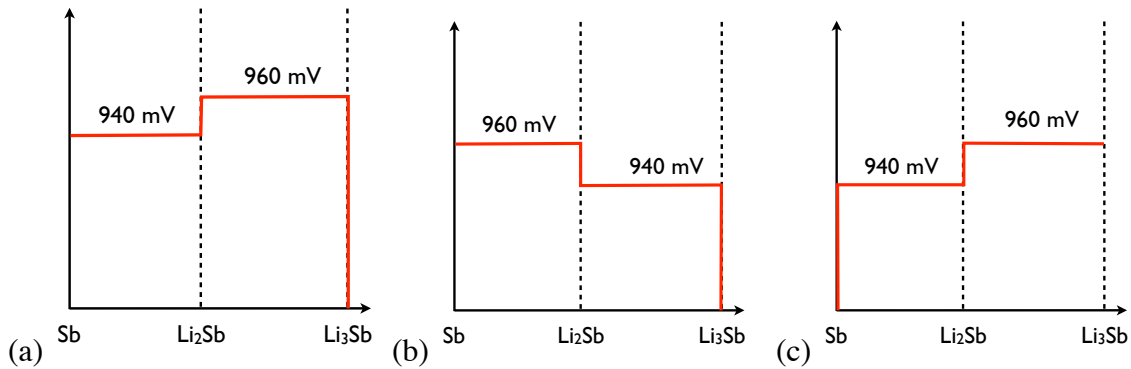
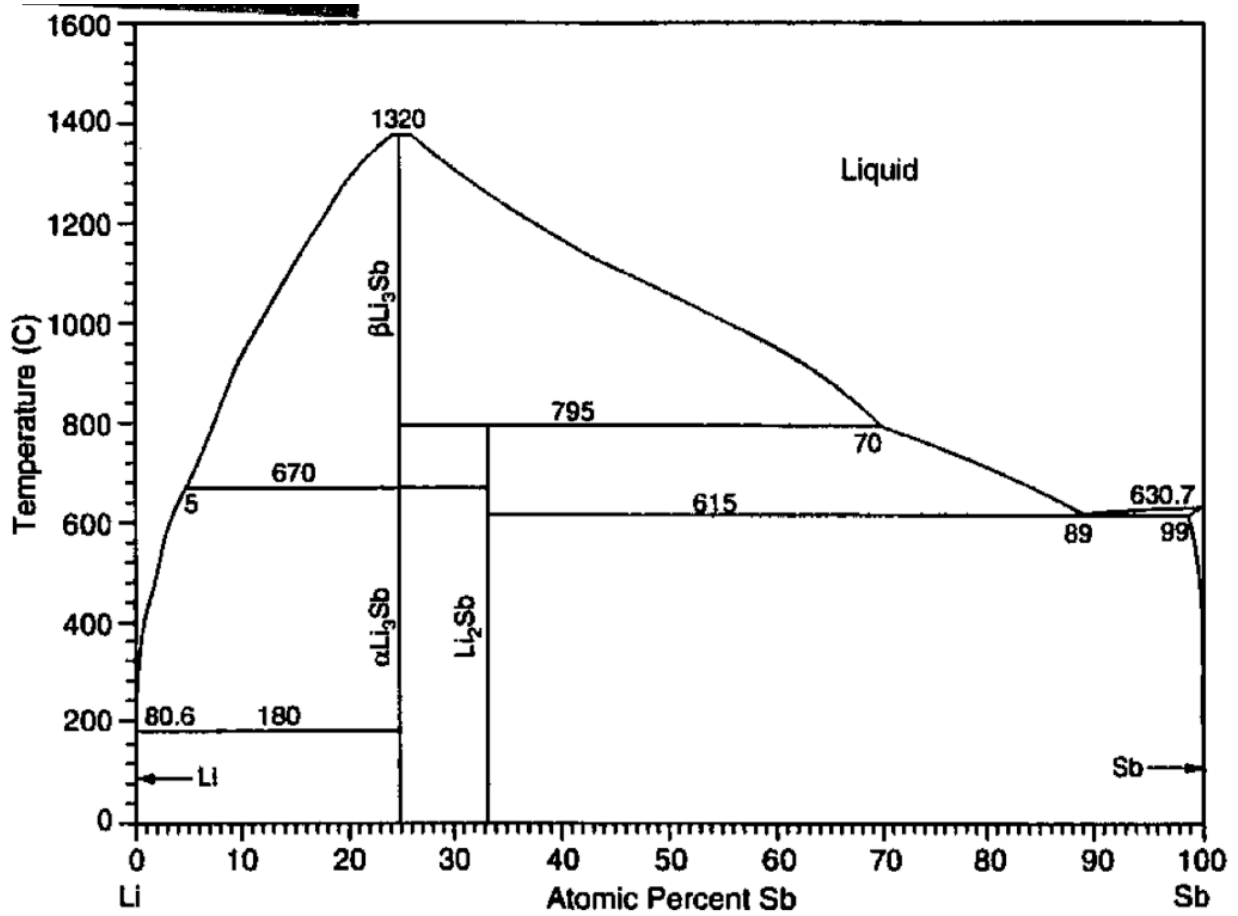


The Materials Science of Rechargeable Batteries

HW #2

For the Li-Sb system, sketch the material potential as a function of Li content for $T=50\text{C}$.



For the following material systems, estimate the enthalpy of transformation as a function of temperature. Use the data below.

Sb/Li₂Sb.

- (a) 79.16 kJ/mole @ 200C
- (b) 166.3 kJ/mole @ 532C
- (c) 166.3 kJ/mole @ 200C
- (d) 800.1 kJ/mole @ 200C
- (e) 194.5 kJ/mole @ 200C

Li₂Sb/Li₃Sb.

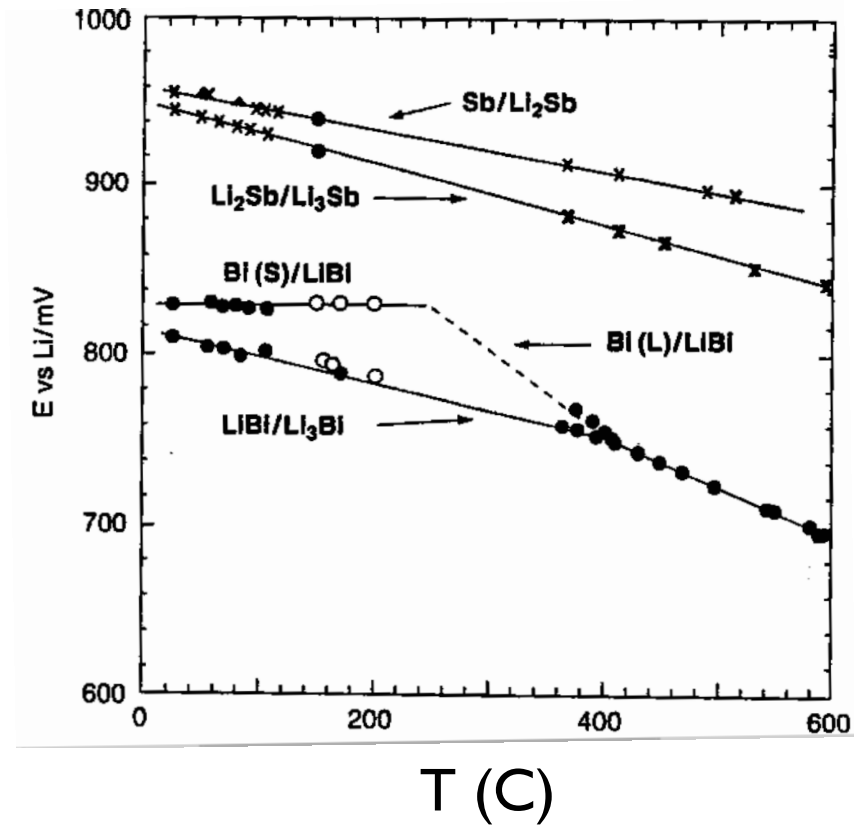
- (a) 79.16 kJ/mole @ 200C
- (b) 80.1 kJ/mole @ 200C
- (c) 158.3 kJ/mole @ 200C
- (d) 800.1 kJ/mole @ 200C
- (e) 38.8 kJ/mole @ 532C

Bi(S)\LiBi.

- (a) 80.1 kJ/mole @ 200C
- (b) 194.5 kJ/mole @ 200C
- (c) 158.3 kJ/mole @ 200C
- (d) 166.3 kJ/mole @ 532C
- (e) 166.3 kJ/mole @ 200C

Bi(L)/LiBi.

- (a) 80.1 kJ/mole @ 532C
- (b) 79.16 kJ/mole @ 532C
- (c) 166.3 kJ/mole @ 532C
- (d) 231 kJ/mole @ 532C
- (e) 38.8 kJ/mole @ 532C



Explain why is the curvature of the voltage versus temperature almost flat.

- (a) Because the entropy of transformation is very small.
- (b) Because these materials have a very low heat capacity.
- (c) Because the enthalpy of transformation is very small.
- (d) Because F is so large that the ratio $C_p/(zFT)$ is very small.