CO2 Triple Point Determination and Enthalpy of Sublimation Calculation.

Introduction:

Methods:

The apparatus used for the experiment was made primarily of 4 parts: a threaded cup, pressure gauge, thermometer and valve. The cup was thick and plastic to allow heat to flow into the system. The threads allow a tight seal to be created between the rest of the apparatus. The thermometer was placed to allow the thermocouple to be touching the liquid carbon dioxide. The wire from the thermocouple was threaded through the apparatus, exiting with an airtight seal to go to a digital readout. The pressure gauge gave an analog reading from the pressure within the cup. The valve was designed to be manually operated and to allow partial activation to so pressure can be released slowly.

[Make an apparatus diagram]

Crushed solid carbon dioxide was placed in the cup of the apparatus and screwed on tight. The valve was closed the first time and the system was allowed to reach about 10 psi. The system was checked for leaks and the valve was opened to release the pressure again. The valve was closed the second time and the temperature and pressure readings immediately began. Values were recorded at 5 second intervals simultaneously. Once the triple point was reached, a few more data points were collected. The pressure was released by opening the valve partially. Once the pressure fell below that of the triple point, the valve was fully opened and the CO2 was removed from the cup.

Data:

Results and Discussion:

How do we determine triple point?

Compare to lit values.

Calculate enthalpy of sublimation based of 10 pairs of points by averaging the enthalpy values for each pair of points.

Calculate enthalpy of sublimation using the slope of the ln log stuff line. How do those results compare?

Conclusion:

Safety:

References: