

Tin melting experiment - lab report example

[Science](#), [Chemistry](#)



Tin Melting Experiment

Tin Melting Experiment 3-8-11 Group 6 Summary This experiment was conducted to identify the melting point of pure Tin. In order to find that, a ceramic crucible that contained Tin was heated in the furnace up to 400C. 400C is considerably above the estimated melting point of pure Tin. To keep the sample from getting oxidized, nitrogen was introduced into the furnace while it was made sure, that no oxygen entered it. Tin's melting point was virtually determined through its transition from solid to molten state. Tin was then shifted into a coffee can. Sand was already there in the can. A thermocouple sheath made of stainless steel was also introduced into it exactly quarter of an inch above the crucible's base. The isolation was created with a glass fiber that decelerated the cooling process. The experiment used this time to note the data. He noticed the alteration of temperature with respect to time. Until the temperature of Tin reached 150C, temperature was noted several times at an interval of 5 seconds. 150C is essentially 10C above the freezing point of Tin. This was done so as to ensure that the thermocouple sheath does not get frozen. Once the data was completely collected, the Tin cooling curve was developed using the information of temperature versus time. Abstract This experiment was intended to find out Tin's melting point for which, a ceramic crucible that contained Tin was heated in a furnace enough to get the temperature above Tin's estimated melting point. The molten Tin was shifted to the coffee can filled with sand. A thermocouple sheath was placed into the molten Tin and was isolated with a glass fiber. The cooling process was slowed down due to that and the experimenter noted the data meanwhile. Finally, with the help

of data of temperature alteration with time, the Tin cooling curve was formulated. The collected data was compared with the real data noted in the periodic table to identify the extent of errors that may possibly have occurred during the experiment. Table of contents

Summary..... page 2

Abstract..... page 3 Table of contents..... page 4

Introduction..... page 5 Experimental procedure..... page 6-7 Results page 8-10

Discussion..... page 11

Conclusion..... page 12 Introduction

Different elements exhibit different behaviors with respect to freezing and melting processes. There are elements that have a well defined freezing and melting point, while there are others that do not have a specific melting and freezing point. This experiment was conducted to determine the melting point of pure Tin from the Tin cooling curve. Experimental procedure A.

Equipment used 1. Furnace. 2. Omega temperature meter. 3. Glass fiber for insulation. 4. Thermocouple sheath. 5. Plastic gloves. 6. Coffee can containing sand. 7. Ceramic crucible. B. Procedure 1. A ceramic crucible that contained Tin was heated in the furnace up to 400C. 400C is considerably above the estimated melting point of pure Tin. 2. To keep the sample from getting oxidized, nitrogen was introduced into the furnace while it was made sure, that no oxygen entered it. 3. Tin's melting point was virtually determined through its transition from solid to molten state. 4. Tin was then

shifted into a coffee can. Sand was already there in the can. A thermocouple sheath made of stainless steel was also introduced into it exactly quarter of an inch above the crucible's base. The isolation was created with a glass fiber that decelerated the cooling process. 5. The experiment used this time to note the data. He noticed the alteration of temperature with respect to time. Until the temperature of Tin reached 150C, temperature was noted several times at an interval of 5 seconds. 150C is essentially 10C above the freezing point of Tin. This was done so as to ensure that the thermocouple sheath does not get frozen. 6. Once the data was completely collected, the Tin cooling curve was developed using the information of temperature versus time. Results A. Table of data

Time	Temp	Time	Temp	Time	Temp	Time	Temp
0	450	110	313.9	225	251	340	212.7
5	427	115	309	230	249.2	345	229.3
10	420	120	306	235	247.9	350	232.8
15	411	125	303	240	245	355	232.9
20	405	130	300.1	245	243.3	360	232.9
25	398	135	296	250	241.3	365	233
30	391	140	293.2	255	239.4	370	233
35	384.1	145	290.4	260	237.4	375	233
40	378.4	150	287.3	265	236	380	233
45	371.1	155	285	270	234.3	385	233
50	367	160	282	275	232.5	390	233
55	361.2	165	279.2	280	230	395	233
60	356.6	170	276.6	285	229.1	400	233
65	351.4	175	273.8	290	227.4	405	233
70	346	180	271.5	295	226.4	410	233
75	341	185	268.5	300	224.4	415	233
80	337	190	266.6	305	223	420	233
85	333	195	264.1	310	221.4	425	233
90	328	200	261.8	315	220	430	233
95	324.5	205	259.2	320	218.5	435	233
100	320.3	210	257.6	325	216.9	440	233
105	317	215	255.3	330	215.4	445	233
110	313.9	220	253.3	335	214.1	450	233
115	309	225	251	340	212.7	455	233
120	306	230	249.2	345	229.3	460	233
125	303	235	247.9	350	232.8	465	233
130	300.1	240	245	355	232.9	470	233
135	296	245	241.3	360	232.9	475	233
140	293.2	250	239.4	365	233	480	233
145	290.4	255	237.4	370	233	485	233
150	287.3	260	236	375	233	490	233
155	285	265	234.3	380	233	495	233
160	282	270	232.5	385	233	500	233
165	279.2	275	232.5	390	233	505	233
170	276.6	280	230	395	233	510	233
175	273.8	285	229.1	400	233	515	233
180	271.5	290	227.4	405	233	520	233
185	268.5	295	226.4	410	233	525	233
190	266.6	300	224.4	415	233	530	233
195	264.1	305	223	420	233	535	233
200	261.8	310	221.4	425	233	540	233
205	259.2	315	220	430	233	545	233
210	257.6	320	218.5	435	233	550	233
215	255.3	325	216.9	440	233	555	233
220	253.3	330	215.4	445	233	560	233
225	251	335	214.1	450	233	565	233
230	249.2	340	212.7	455	233	570	233
235	247.9	345	229.3	460	233	575	233
240	245	350	232.8	465	233	580	233
245	241.3	355	232.9	470	233	585	233
250	239.4	360	232.9	475	233	590	233
255	237.4	365	233	480	233	595	233
260	236	370	233	485	233	600	233
265	234.3	375	233	490	233	605	233
270	232.5	380	233	495	233	610	233
275	232.5	385	233	500	233	615	233
280	230	390	233	505	233	620	233
285	229.1	395	233	510	233	625	233
290	227.4	400	233	515	233	630	233
295	226.4	405	233	520	233	635	233
300	224.4	410	233	525	233	640	233
305	223	415	233	530	233	645	233
310	221.4	420	233	535	233	650	233
315	220	425	233	540	233	655	233
320	218.5	430	233	545	233	660	233
325	216.9	435	233	550	233	665	233
330	215.4	440	233	555	233	670	233
335	214.1	445	233	560	233	675	233
340	212.7	450	233	565	233	680	233
345	229.3	455	233	570	233	685	233
350	232.8	460	233	575	233	690	233
355	232.9	465	233	580	233	695	233
360	232.9	470	233	585	233	700	233
365	233	475	233	590	233	705	233
370	233	480	233	595	233	710	233
375	233	485	233	600	233	715	233
380	233	490	233	605	233	720	233
385	233	495	233	610	233	725	233
390	233	500	233	615	233	730	233
395	233	505	233	620	233	735	233
400	233	510	233	625	233	740	233
405	233	515	233	630	233	745	233
410	233	520	233	635	233	750	233
415	233	525	233	640	233	755	233
420	233	530	233	645	233	760	233
425	233	535	233	650	233	765	233
430	233	540	233	655	233	770	233
435	233	545	233	660	233	775	233
440	233	550	233	665	233	780	233
445	233	555	233	670	233	785	233
450	233	560	233	675	233	790	233
455	233	565	233	680	233	795	233
460	233	570	233	685	233	800	233
465	233	575	233	690	233	805	233
470	233	580	233	695	233	810	233
475	233	585	233	700	233	815	233
480	233	590	233	705	233	820	233
485	233	595	233	710	233	825	233
490	233	600	233	715	233	830	233
495	233	605	233	720	233	835	233
500	233	610	233	725	233	840	233
505	233	615	233	730	233	845	233
510	233	620	233	735	233	850	233
515	233	625	233	740	233	855	233
520	233	630	233	745	233	860	233
525	233	635	233	750	233	865	233
530	233	640	233	755	233	870	233
535	233	645	233	760	233	875	233
540	233	650	233	765	233	880	233
545	233	655	233	770	233	885	233
550	233	660	233	775	233	890	233
555	233	665	233	780	233	895	233
560	233	670	233	785	233	900	233
565	233	675	233	790	233	905	233
570	233	680	233	795	233	910	233
575	233	685	233	800	233	915	233
580	233	690	233	805	233	920	233
585	233	695	233	810	233	925	233
590	233	700	233	815	233	930	233
595	233	705	233	820	233	935	233
600	233	710	233	825	233	940	233
605	233	715	233	830	233	945	233
610	233	720	233	835	233	950	233
615	233	725	233	840	233	955	233
620	233	730	233	845	233	960	233
625	233	735	233	850	233	965	233
630	233	740	233	855	233	970	233
635	233	745	233	860	233	975	233
640	233	750	233	865	233	980	233
645	233	755	233	870	233	985	233
650	233	760	233	875	233	990	233
655	233	765	233	880	233	995	233
660	233	770	233	885	233	1000	233

585 222. 1 700 185 815 163 470 233 590 220 705 184. 5 820 162. 3 475
233 595 217. 6 710 183. 3 825 161. 6 480 233 600 215. 5 715 182. 2 830
160. 7 485 233 605 214. 9 720 181. 1 835 160 490 233 610 212 725 180
840 159. 3 495 233 615 210 730 179 845 158. 4 500 232. 9 620 208 735
177 850 157. 7 505 232. 9 625 206 740 176. 8 855 156. 7 510 232. 9 630
205 745 175. 7 860 156 515 232. 8 635 203. 8 750 174. 8 865 155. 4 520
232. 8 640 201. 9 755 173. 7 870 154. 6 525 232. 7 645 200 760 173 875
153. 9 530 232. 7 650 199 765 171. 8 880 153. 4 535 232. 6 655 197. 2 770
170. 9 885 152. 7 540 232. 3 660 196 775 170 890 152. 1 545 232 665 194.
5 780 169 895 151. 3 550 231. 7 670 193. 2 785 168. 2 900 150. 7 555 231.
3 675 192 790 167. 3 905 150 560 230. 8 680 190. 8 795 166. 6 910 149. 3
565 230. 2 685 189 800 165. 5 915 148. 8 570 229. 2 B. The cooling curve

Table 1 C. Class results Tuesday:(232+233+233) Wednesday:

(233+233+233+233+233) Ave= 233 Percent error=

$((\text{calculated}-\text{actual})/\text{actual})\times 100 = .0370$ Discussion The collected data was compared with the real data noted in the periodic table to identify the extent of errors that may possibly have occurred during the experiment. The

following factors are potential causes of error in the experiment: 1.

Calibration of temperature meter 2. Calibration of thermo couple 3. Amount of decimal places in the temperature meter. Conclusion The minute error

found is quite normal given the insufficient calibration of equipment used. In addition to that, some error might also have been introduced because of insulation. Overall, however, the collected results do not match with the real results. Therefore, the experiment can not be termed as perfect and free of error.