

Chapter VI


Conclusion

The first achievement for this investigation is the development of a method to study the batch melting processes at more realistic dimensions. The measurement of resistivity changes in terms of voltage is very useful to indicate the formation of primary liquid phase and also the temperature at this point can be determined by using the thermocouple.

The primary liquid phase formation temperature at different positions in the batch blanket is not equal. In other words, the reaction temperature, T_R is not uniform all over the batch blanket. Its depend on the local heating rate. For the outer part of the blanket which is exposed to fast heating, the primary liquid phase occurs at the lower temperaure of soda lime reaction reaction. By contrast, in the inner part of the blanket which is exposed to slow heating, the primary liquid phase occurs at the higher temperaure of the soda quartz reaction. Increasing amounts of sulphate/coal equivalents (yielding Na_2S) level out this difference and decrease the reaction temperatures towards below 900°C , even upon slow heating. As a consequence of the above observation, the time demand of batch melting depends on the heating rate more strongly by the mere physical effect. High heating rates, direct the system along a path cohere liquid phase occurs at lower temperatures.

The heat transfer from the environment to the batch blanket will be the rate determining process if the driving temperature diffe-

rences low. Alternatively, the drainage flows of liquid phase in the glass batch might be the rate controlling process. But here is little evidence supporting this idea. The experiments show that, the lower part of the batch blanket which is in contact with the established melt remains "dry" (no any liquid phase occurs) for at least 20 minutes. So we can say that, the drainage flows of liquid phase are faster than the liquid phase generated from the reaction, and hence do not control the rate of batch melting.



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