

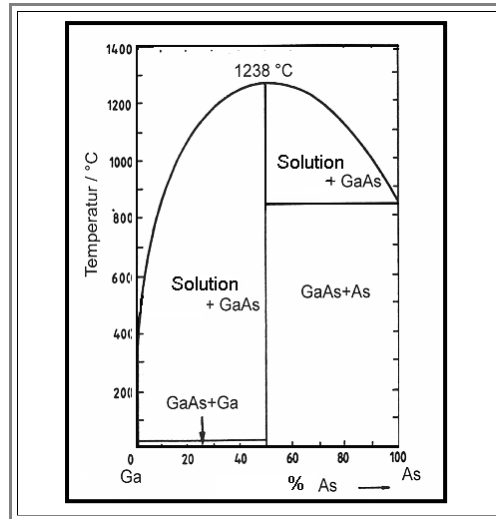
9.2 Bulk Crystals

9.2.1 GaAs

Basic Properties

Producing **GaAs** crystals must start with a consideration of its phase diagram.

- Here it is. It is already sufficient to show that there is only a very small region where you can get solid and stoichiometric GaAs, essentially a line. Small deviations to the left or right will produce some liquid encasements - right after solidification and some Ga or As related defects after complete solidification.



- If you think you could avoid or at least minimize those defects (that cannot possibly be good for a device) by melting a perfect 50 : 50 mix of Ga and As, you must think again. Ga will start to evaporate out of your mix as soon as it melts, changing the compositions. and son on.....

The message should be clear: It is far more difficult to produce a defect-free **GaAs** crystal than it is possible for **Si**. It is actually impossible. And that is true for all compound semiconductors.

- The problems with III-V technology start right here!

--- To be continued (or possibly not) ---