GENERAL CONCLUSIONS

The summary of the observations and conclusions are presented at the end of each chapter. Here, only those conclusions of a general nature are discussed.

Impurities and dislocations play a major role in the nucleation and growth of needle-like crystals. Further, the nucleation is influenced considerably by the supersaturation. The habit of growth depends on the temperature gradient as well as the supersaturation ratio inside the container. In the case of Te the needle crystals acquire a hollow funnel-shaped core, which is attributed to the presence of screw dislocations of large Burgers vector parallel to the crystal axis. No Vapour-Liquid-Solid mechanism is active in the growth process. The twin mechanism of growth occurs in a few cases and as a result short hexagonal prisms with well developed dome faces are formed.

The studies on zinc, by deliberate addition of impurity, have shown that the growth habit does not depend on the impurity concentration. Only the rate of nucleation and growth rate are influenced by impurities.

Thermal etching can be successfully employed to reveal dislocations, with proper choice of temperature

and pressure. The one to one correspondence of etch pits could not be established conclusively. However, on a surface etched in hot H_2SO_4 after it had been etched thermally, a pit formed at each thermally etched pit. But the density of pits when chemically etched is higher by an order of 10 than that of the thermal etch pits.

On etching the as grown dome faces, it is found that the density of dislocations emerging on these faces is much higher than that on the prism faces. The density is higher on the outer edges of the faces which shows that the thickening of the crystals takes place after the cessation of linear growth, the higher density being due to the added incorporation of impurities.

However, the observations presented in the thesis have their own limitations. Comparatively large Te crystals of low dislocation density can be grown from the vapour phase. But the effect of growth parameters on the mode of growth could not be deduced precisely. It was not possible to make a quantitative assessment of the local supersaturation near a growing crystal. The supersaturation gradient has been assessed from the geometry of the container and the temperature gradient.