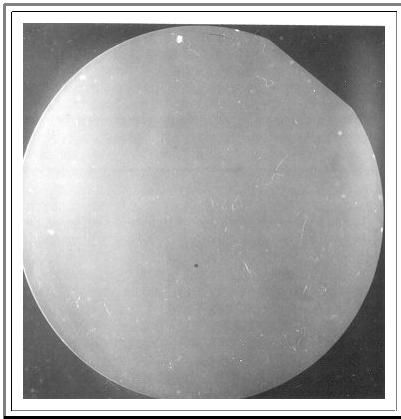


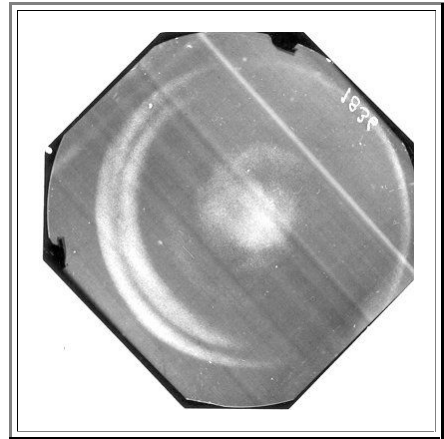
X-Ray Topography Case Study

Illustration

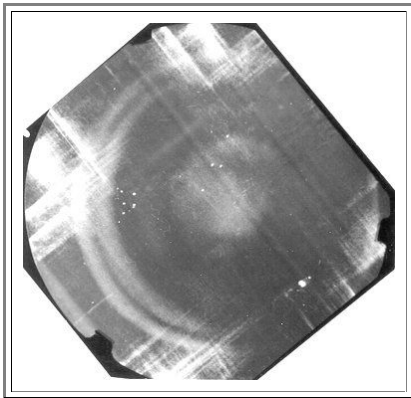
The following sequence shows X-ray topograms taken from the same wafer after major processing steps for bipolar devices.



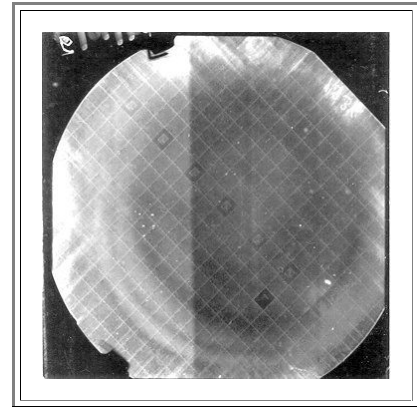
Starting wafer; no defect structures are visible



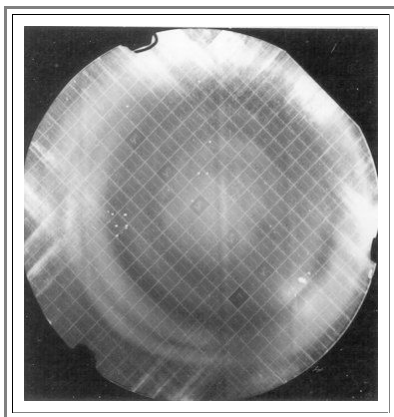
After "buried layer" diffusion; the first high temperature process.
The ring like structures are typical for oxygen precipitation.



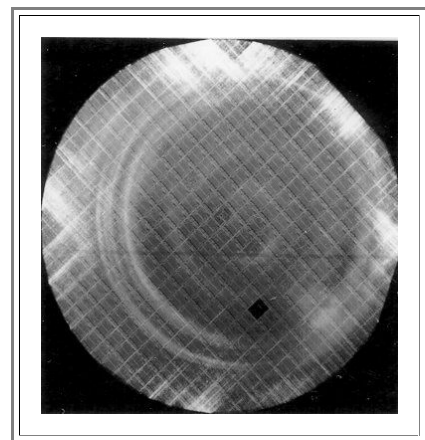
After epitaxial layer deposition. Very high temperatures are used, in this case some plastic deformation produced dislocation arrays



After collector diffusion. The defect structure remains essentially unchanged, first device structures become visible.



After base diffusion



Finished wafer.

The sequence of topograms established that the crucial processes for defect generation are the buried layer diffusion and the epitaxy. The processes coming later may change the size and structure of the defects already present, but they do not generate new defects.