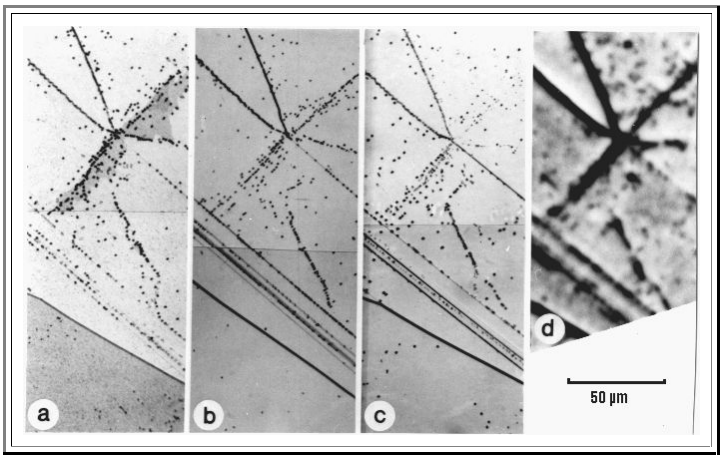
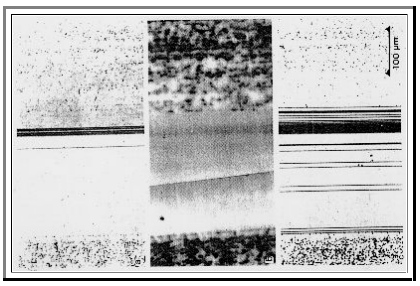
Comparison of Anodic Etching to Chemical Etching and EBIC

Illustration

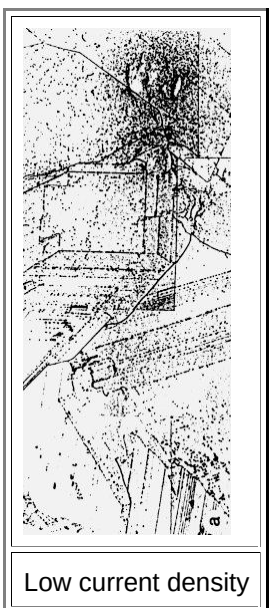
- The results obtained with **anodic etching** depend on the current density used. For small current densities there is a tendency to reveal only electronically active defects, whereas at higher current densities all defects are etched. This can be seen in comparison with "normal" chemical etching and with **EBIC**



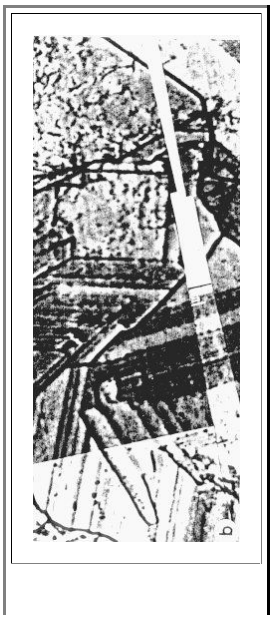
- The pictures show the same area of a solar **Si** sample (always repolished after one experiment):
  - **a)** Anodically etched at small current density. Only some of the twin boundaries at the lower half of the picture are faintly delineated.
  - **b)** Anodically etched at high current density. The twin boundaries at the lower half of the picture are delineated.
  - **b)** Chemically etched. The twin boundaries are partially delineated.
  - **c) EBIC** Micrograph. Upon close inspection, it is mostly compatible with **a)**.
- This gives the impression that anodic etching at small current densities reveals only electronically active defects whereas at higher current densities it shows all defects. This can be clearly demonstrated in another optimized comparison below

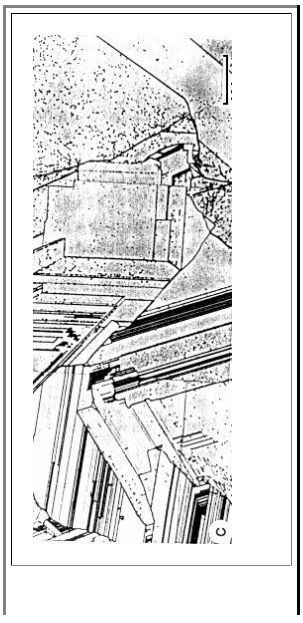


  - Left, the etching structure obtained at small, on the right with high current densities. The **EBIC** picture is shown in the middle. It is obvious that only a few twin boundaries show up at low current densities and in the **EBIC** mode.
- One more example confirms this result



Low current density





Low current density

EBIC

High current densitiy