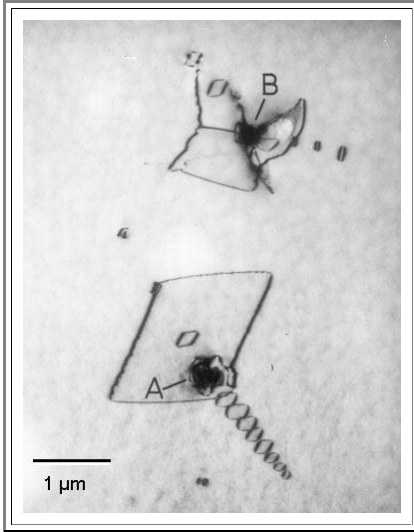


Precipitates and Dislocations

Illustration

- ▣ Precipitates usually do not fit into the host lattice. The growing particle causes considerable stress that can be reduced by plastic deformation.
- If the precipitate fits in one lattice direction, but not in others (a precipitate with a hexagonal lattice, e.g., may fit relatively well on the $\{111\}$ planes of an **fcc** lattice) a compromise between a non-spherical shape of the precipitate and a system of dislocation loops in some direction may produce least strain energy. The precipitate-dislocation system then has a very specific structure; the process is known as "prismatic loop punching". An example is shown below on the left (taken under kinematic bright field conditions).



Precipitate with prismatic loops. An arrangement like that accounts for the [peculiar etch features](#) shown before

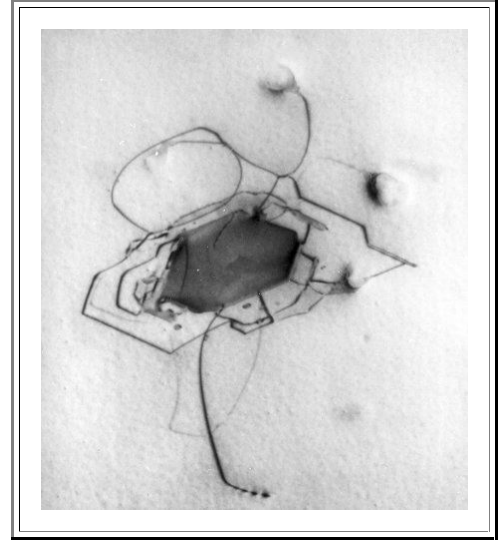


Plate-like precipitate (the dark grey feature) with dislocations relieving parts of the stress.

- The two precipitates ("A" and "B") are seen as dark shapes; their nature is unclear, but they are probably **SiO₂**