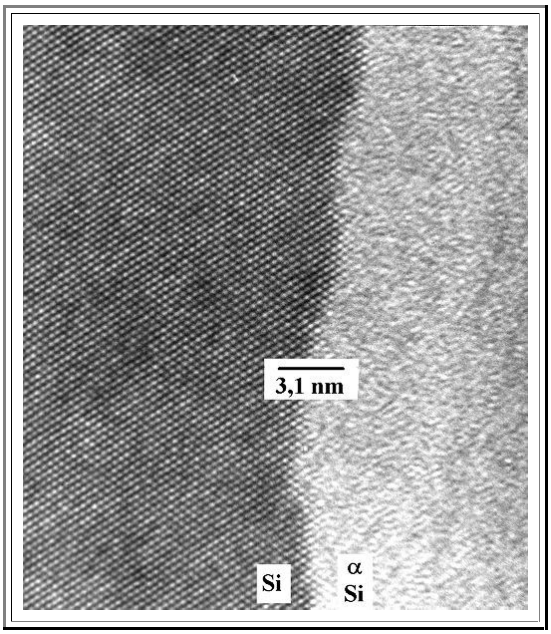
Amorphization after Ion Implantation

Illustration

- The picture below shows the boundary between crystalline **Si**, and **Si** that has been rendered *amorphous* by an ion implantation (the ion beam came from the right). The picture is slightly remarkable because it was the first high resolution transmission electron microscopy (**HRTEM**) picture ever taken from damage after ion implantation.
  - There is indeed an amorphous **Si** (α-**Si**) layer. (Think a minute how you could ascertain that without transmission electron microscopy).
  - There is a pretty abrupt, if somewhat wavy boundary between the amorphous and the crystalline **Si**.
  - There seems to be little disturbance in the **Si** lattice - it looks pretty perfect.



- Quick glances at **HRTEM** pictures may be deceiving, however.
  - A lot of point defects may be contained in the lattice - they would not clearly show in this picture
  - Looking a bit more closely at some greater depth (to the left of the above picture), a high density of dislocations is found. An example is shown below; the ending lattice planes are indicated with yellow lines.
  - Note that not all dislocations will show up in this kind of imaging mode.