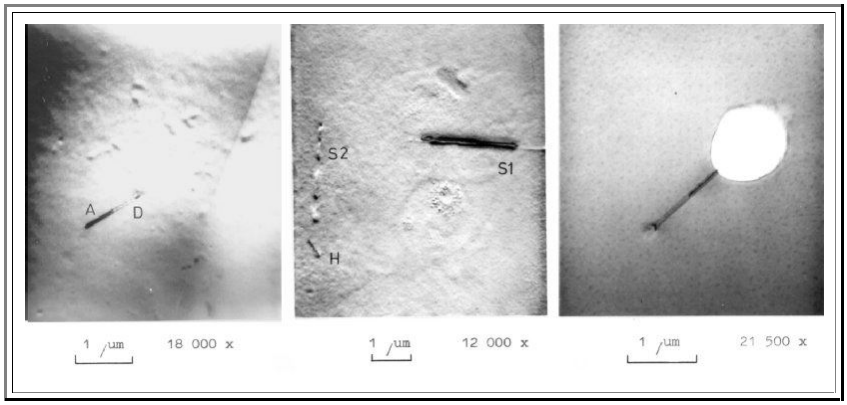
Iron Precipitates in Si Integrated Circuits

Illustration

- Iron is a major contaminant in integrated circuits because there is a lot of steel in contact with the wafers or with materials needed to process a wafer.
  - Iron atoms diffuse as interstitials; they are rather mobile. Since the solubility at low temperatures is low, there is a strong tendency for agglomeration. The small iron silicide precipitates in turn serve as nucleation centers for large defects, especially the huge oxidation induced stacking faults.
  - An iron concentration of well below **1** ***ppb*** thus may enough to kill all integrated circuits in the thus "contaminated" part of a wafer.



  - The defects shown are almost certainly **$FeSi_2$** precipitates, which often occur in "needle-shape". Some stacking fault and dislocation dipole components may also be involved. These needles are already very large; the defects labelled "**H**" may be a smaller needle.