Artefacts during e-beam deposition of Pt or W cap layers

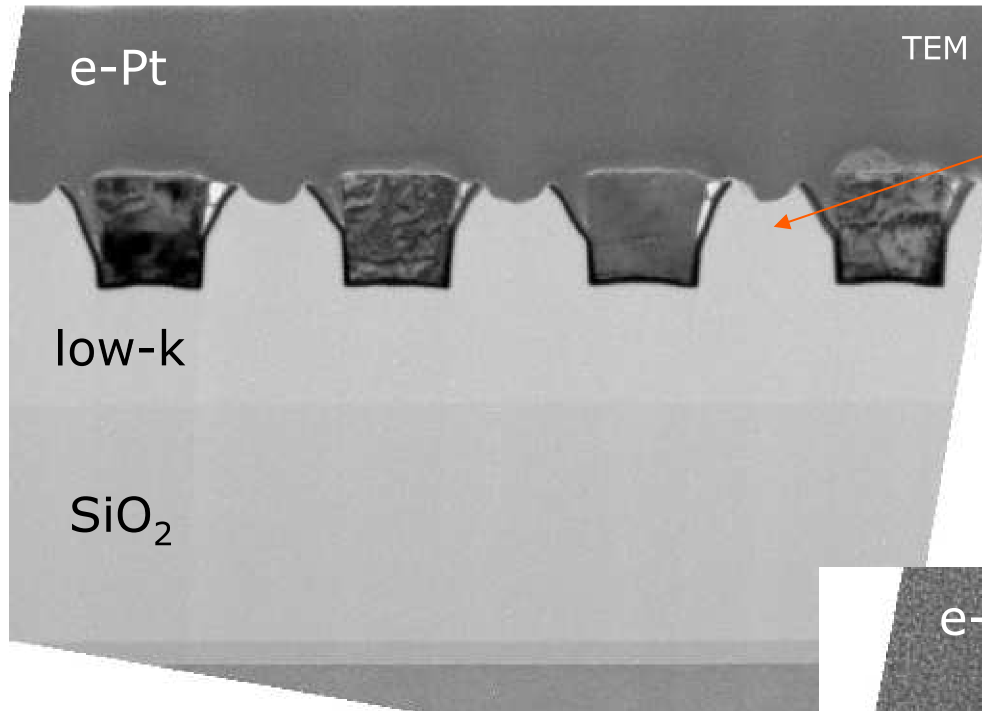
H. Bender, O. Richard, J. Geypen, IMEC, Belgium

Ion beam deposition of capping layers (Pt or W) for FIB cross-section imaging or TEM preparation leads to a deep amorphised and mixed layer, e.g. ~ 60 nm in Si at 30 keV.

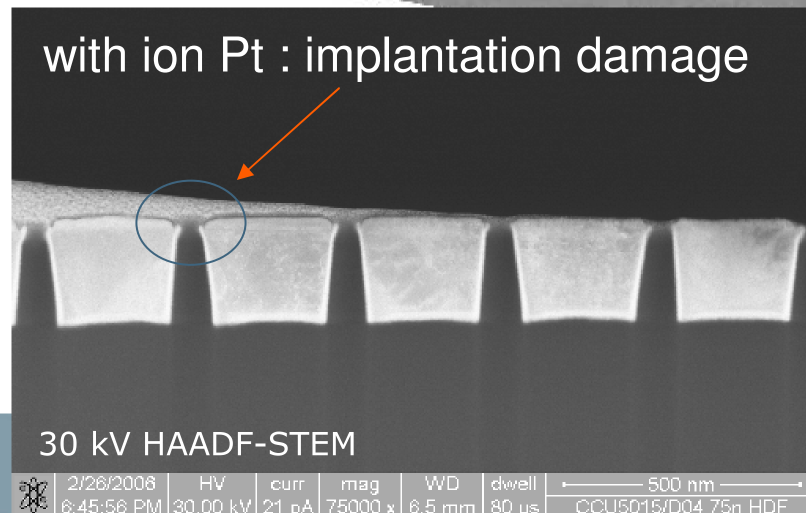
Electron beam deposition is often a good alternative but requires high electron beam currents to obtain reasonable deposition rates. The high current can create damage as well, e.g. :

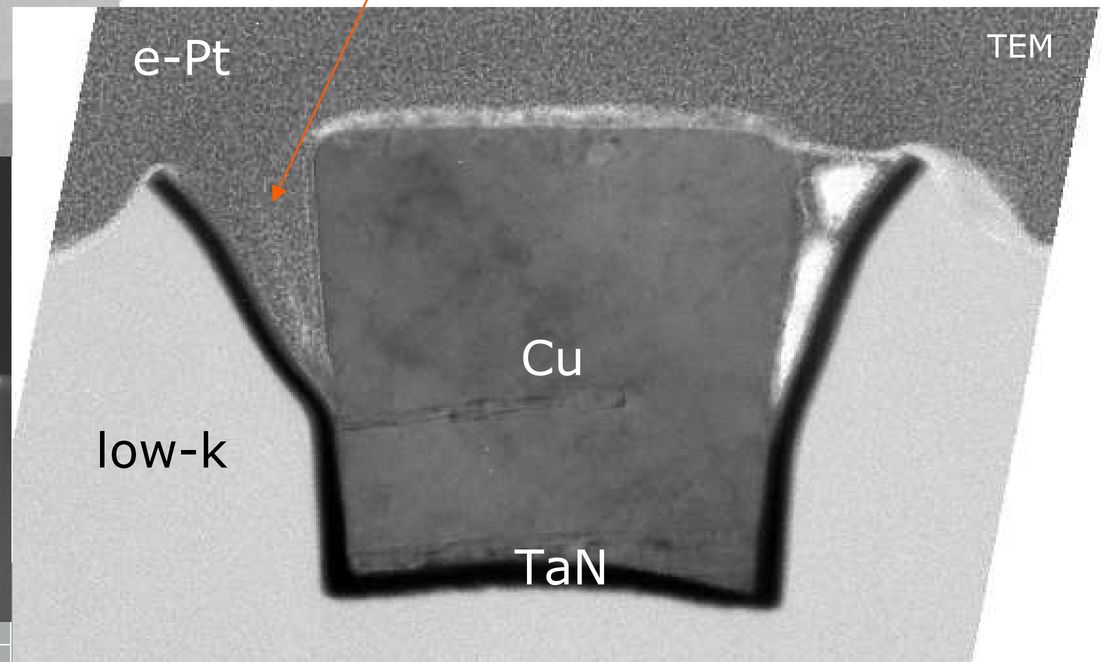
- Electron beam sensitive materials (low-k dielectrics) can shrink
- Very narrow lines can fall over due to charging
- Pt can diffuse in amorphous silicon

electron beam induced shrinkage



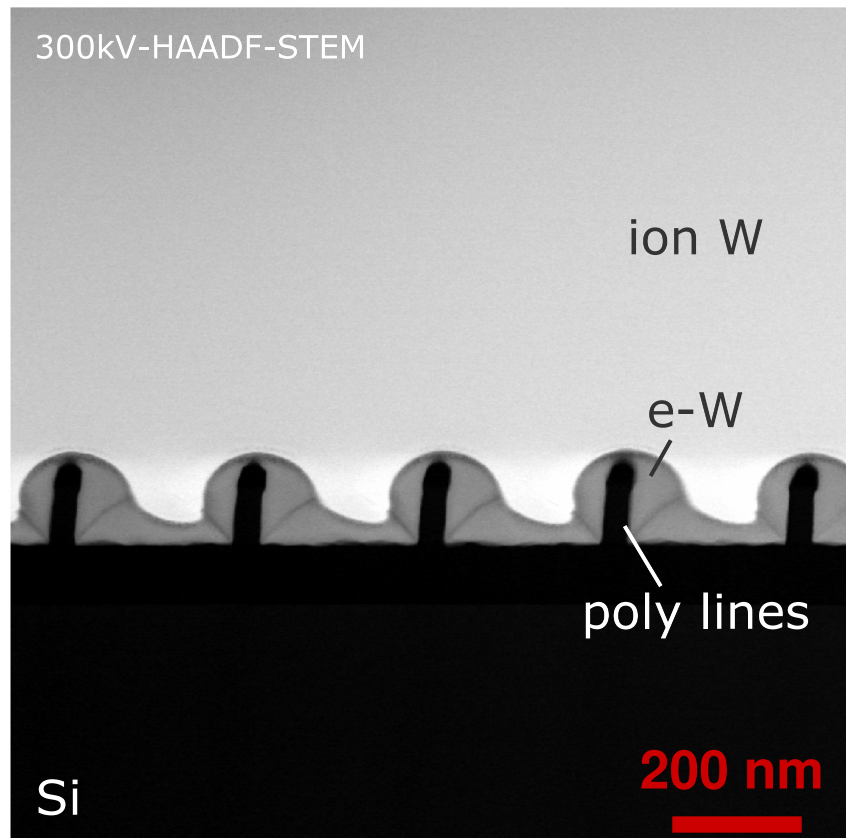
- shrinkage of the low-k and collapse of the barrier (which must have excellent adhesion to the low-k ...)
- the gaps are filled with e-Pt

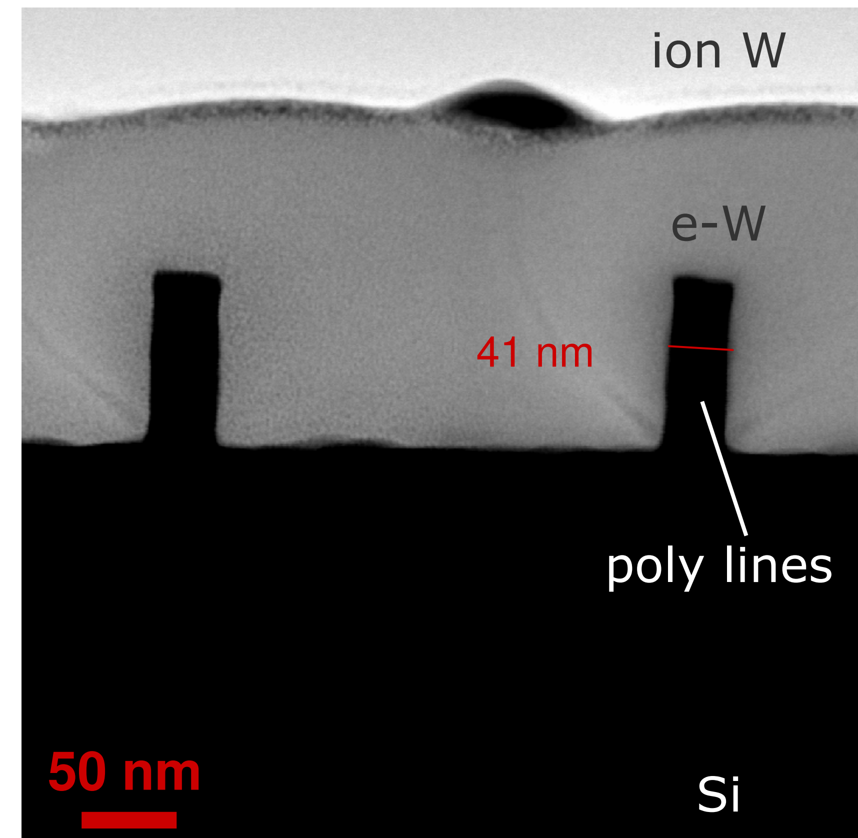




fall over of narrow lines

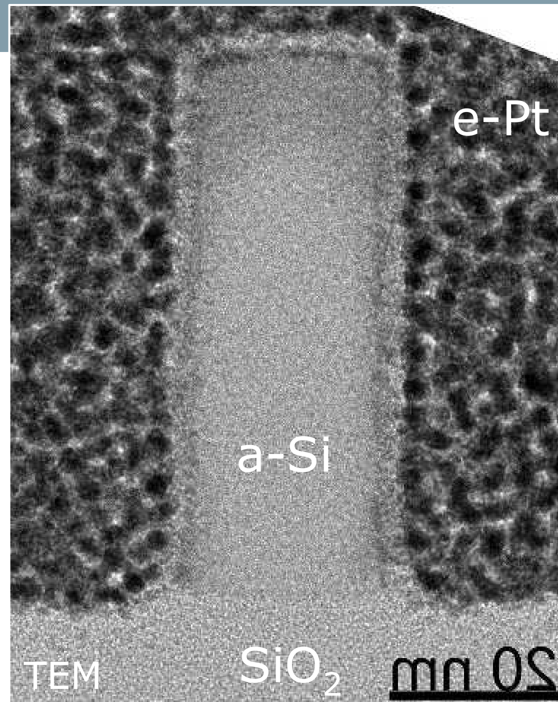
- due to the high e-beam current narrow lines can fall over

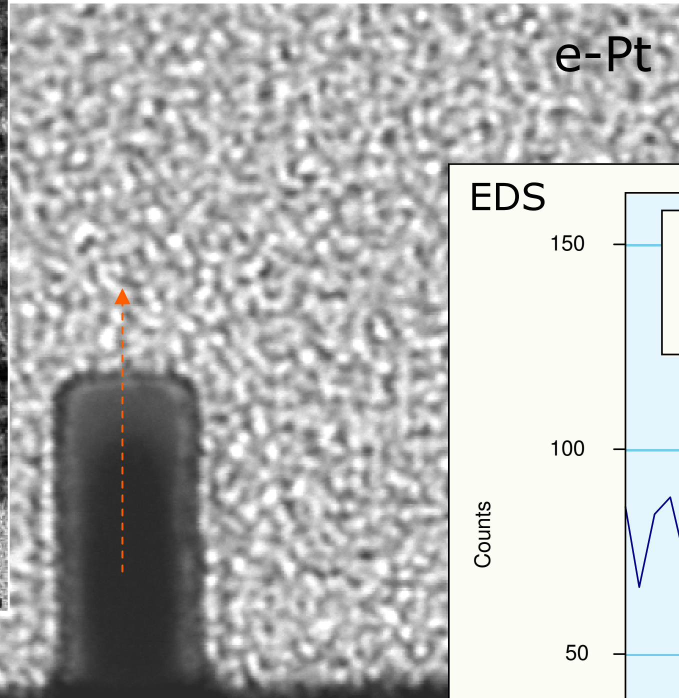


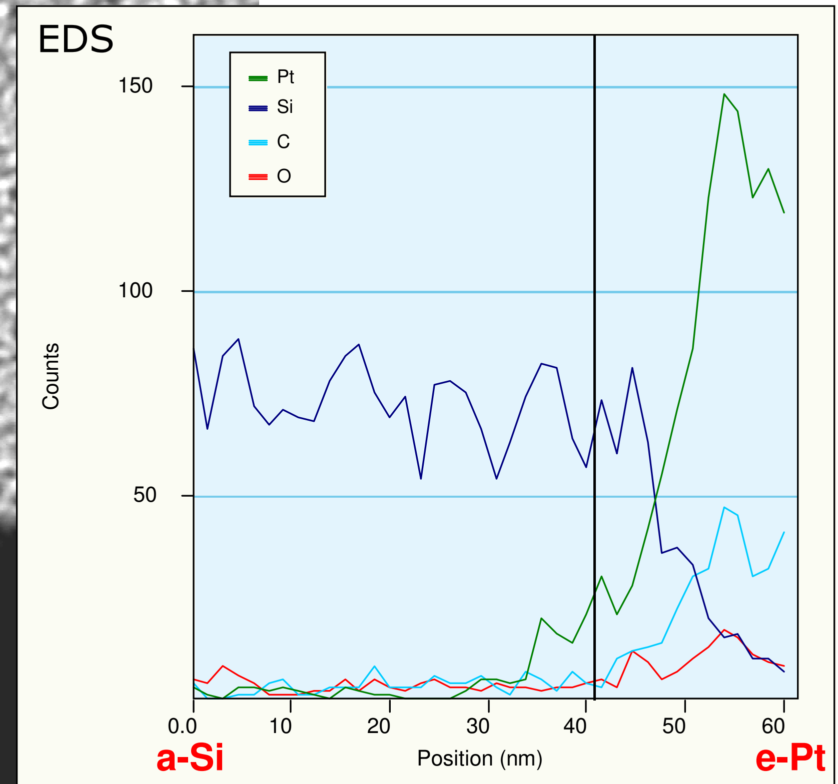


© imec 2007

Pt diffusion in a-Si







© imec 2007