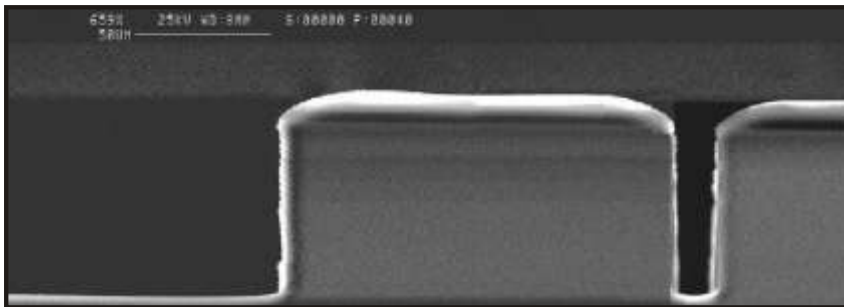


Plasmalab Data

"ARDE": Aspect Ratio Dependent Etching

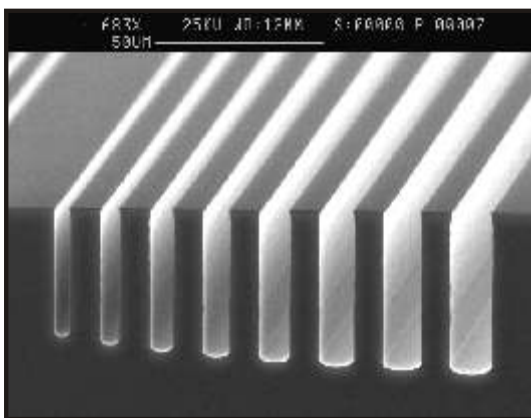
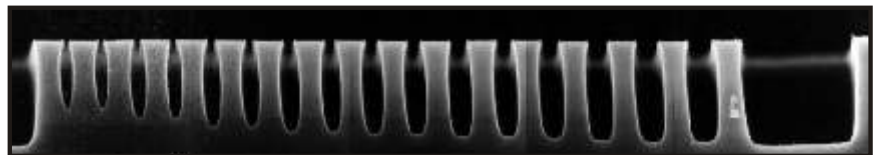


70 μm deep "Si Bosch" etch with low ARDE effect
ARDE is "Aspect ratio dependent etch (rate)"
The etch rate lowers at high aspect ratios (> 5 : 1)
due to gas transport limitations.

10 μm deep Si RIE using Cl/ F chemistry
with kind permission of Uni Dortmund (1992)

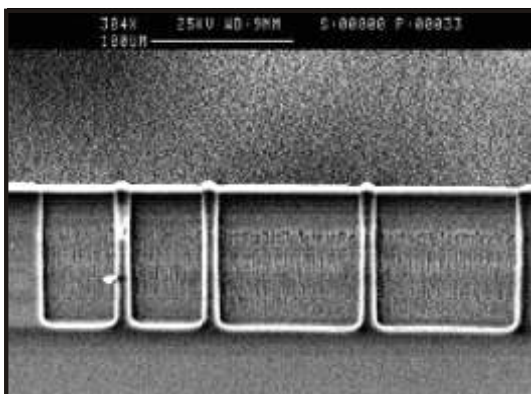
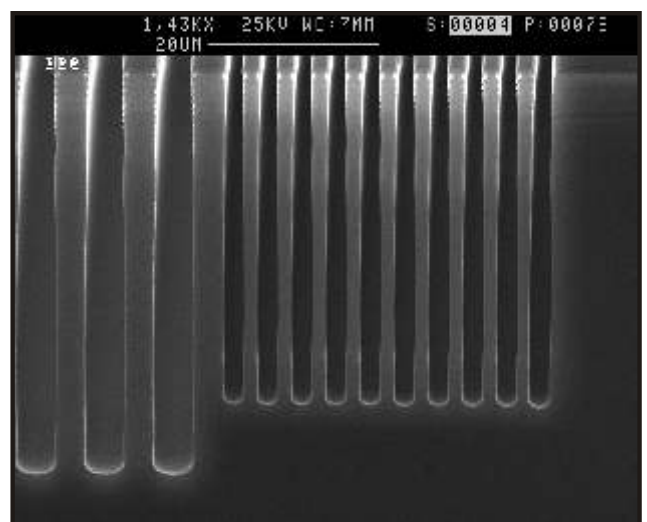


etch rate vs aspect ratio



typical example of ARDE in a Bosch deep Si etch process

80 μm deep Si etch using the Bosch process



110 μm deep Bosch Si etch "without" ARDE effect

The Aspect Ratio dependence of the etch rate is a normal phenomenon, which appears in many etch process, especially at high rates, where the rate is often limited by the transport of etching species to the trench bottom and the transport of etch products out of the trenches. There are ways to reduce the effect, typically at the expense of rate, selectivity or profile. It is important to understand the effect well for defining the MEMS design rules !