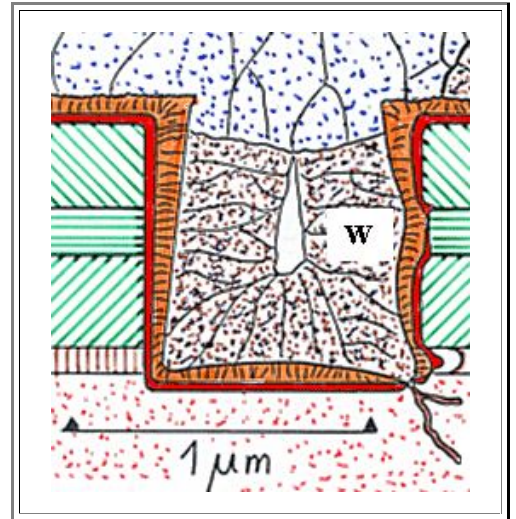


## 6.4.4 Summary to: 6.4 Etching Techniques

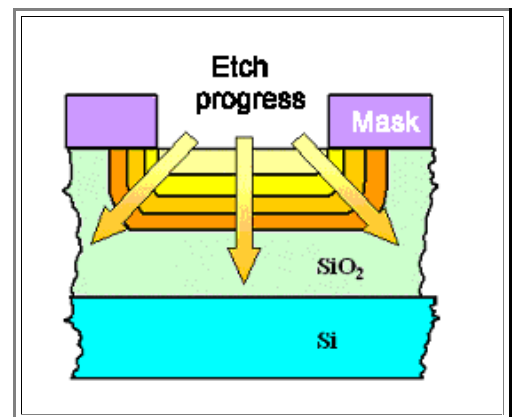
**Structuring** means selective removal of material (through a mask) by etching. There are three main conditions for etching:

1. Must attack material to be etched  $\Rightarrow$  *etching rate*.
2. Must *not* attack everything else  $\Rightarrow$  *selectivity*.
3. Must conserve structure of mask (good on left side of picture, not so good on right side).



### Chemical etching:

1. Can be near perfect for points 1. and 2.. Example: **HF** attacks only **SiO<sub>2</sub>** but not **Si** and most other materials.
2. Fails miserably on point 3.
3. Underetching is unavoidable. Can't be used for lateral structure sizes  $< \approx 2 \mu\text{m}$



### Plasma etching ("Dry" etching)

1. In a plasma quite unusual reactions can take place - including reactions never seen in normal chemistry. Many materials can be etched in a suitable plasma
2. Etching might preserve the lateral mask dimensions - for reasons not always entirely clear
3. There is tremendous potential in plasma etching because of the tremendously large parameter space - and tremendous problems and costs for the same reasons
4. Allmost all "small" structures in semiconductor technology are obtained by plasma etching

