

Deep Reactive Ion Etching Technology

Talal M. Jaafar

Plan

- Background
- DRIE (Bosch Process)
- Fabrication Results
- Conclusions
- Questions

Background

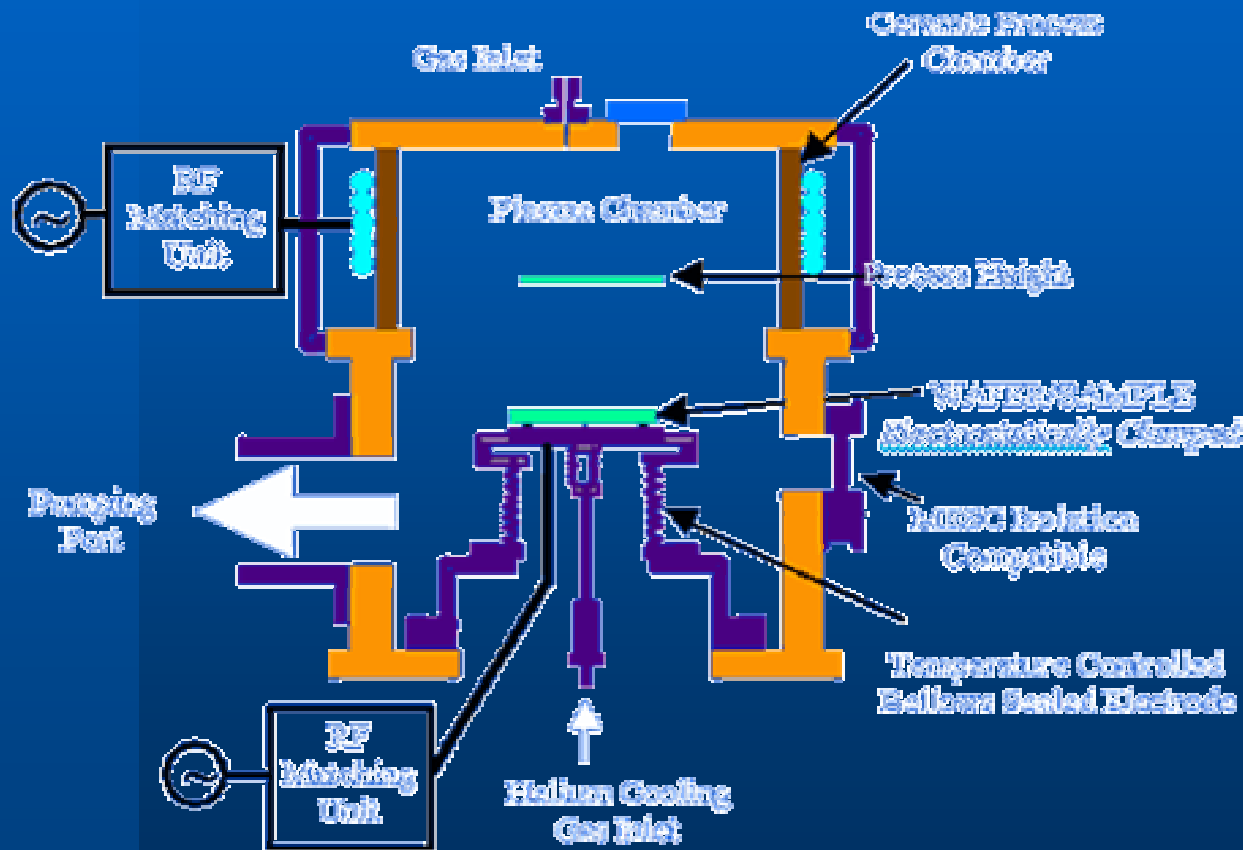
- Etching Processes:

- ❖ Wet Etching

- ❖ Dry Etching

Wet Etching

- Simple Technology
- Cheap Process
- Specific combination of etchant and mask material
- Deep etch rate is not feasible

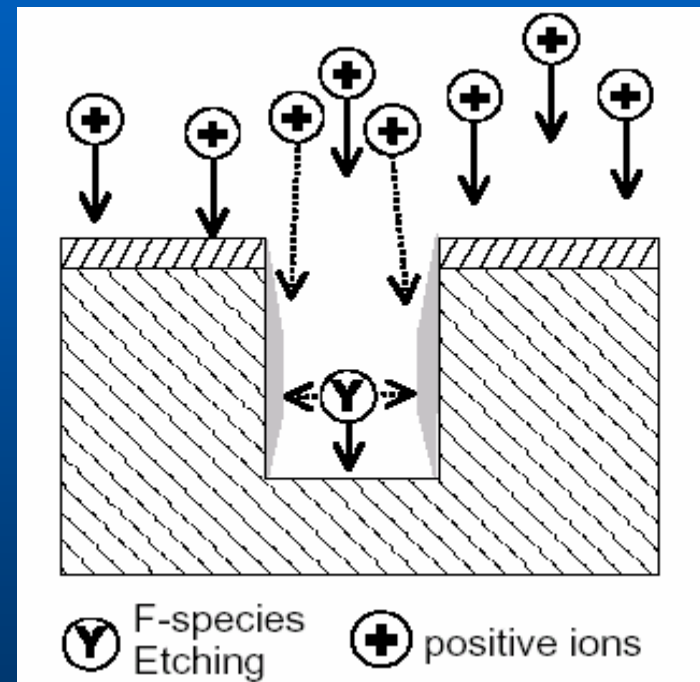
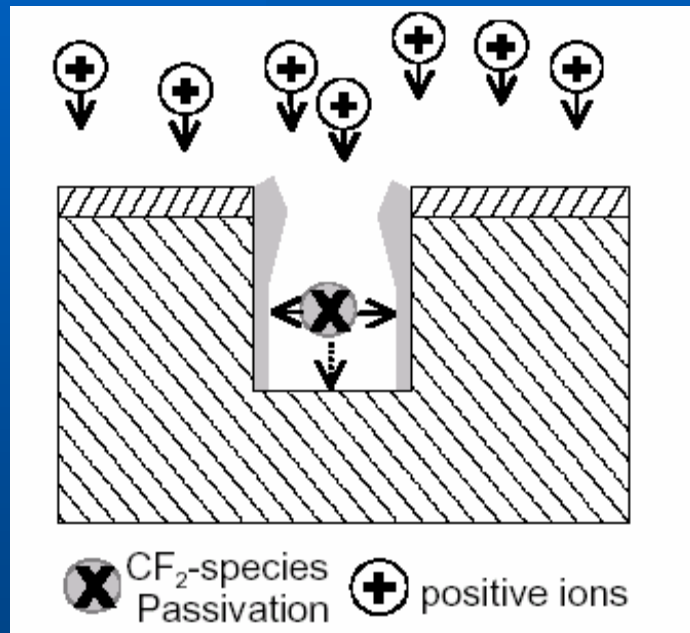


How deep etching is accomplished?

- **Bosch Process**

- ❖ **Creation of a polymer on the surface of the substrate**
- ❖ **Etching the substrate**

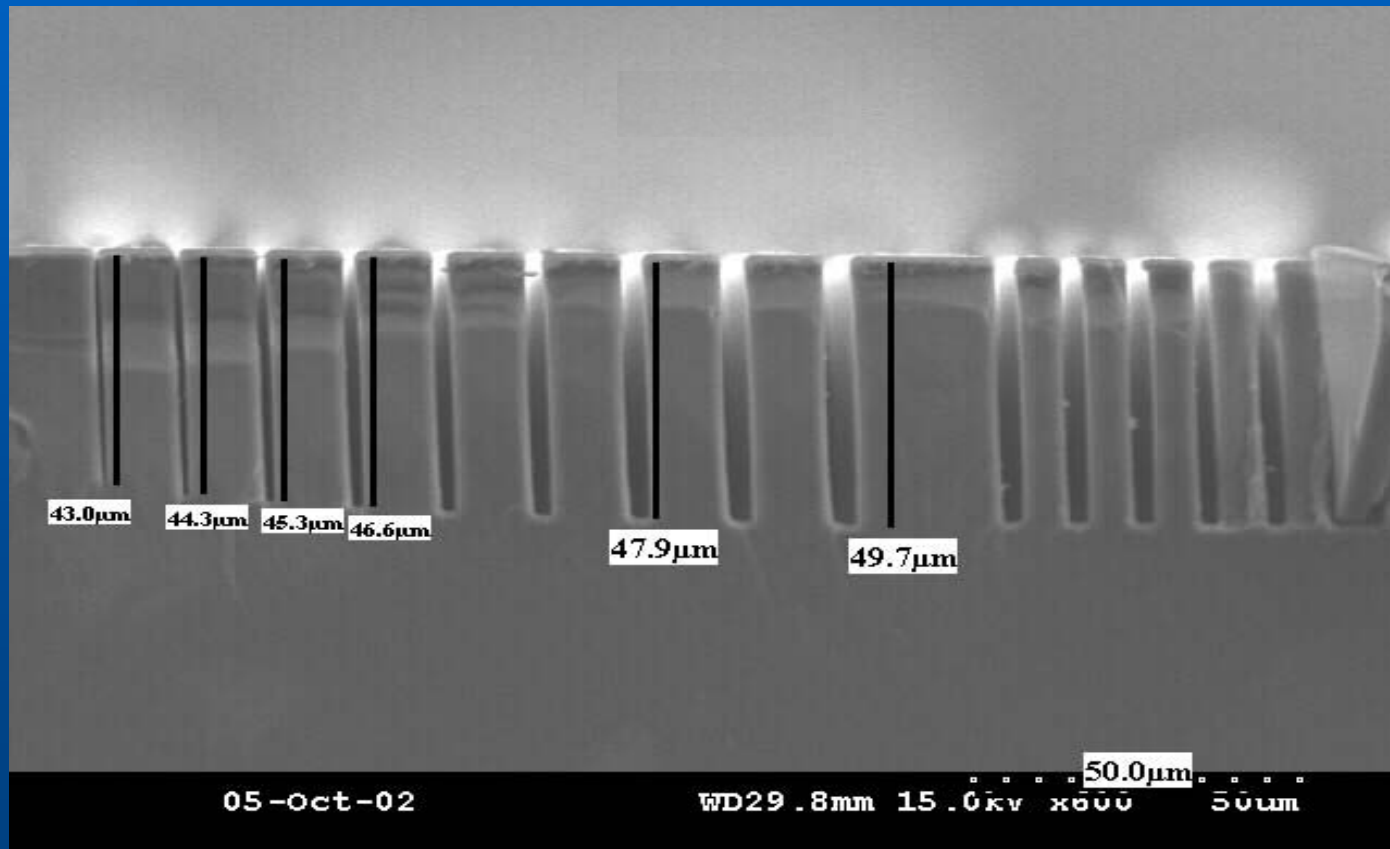
Bosch Process, Cont'd



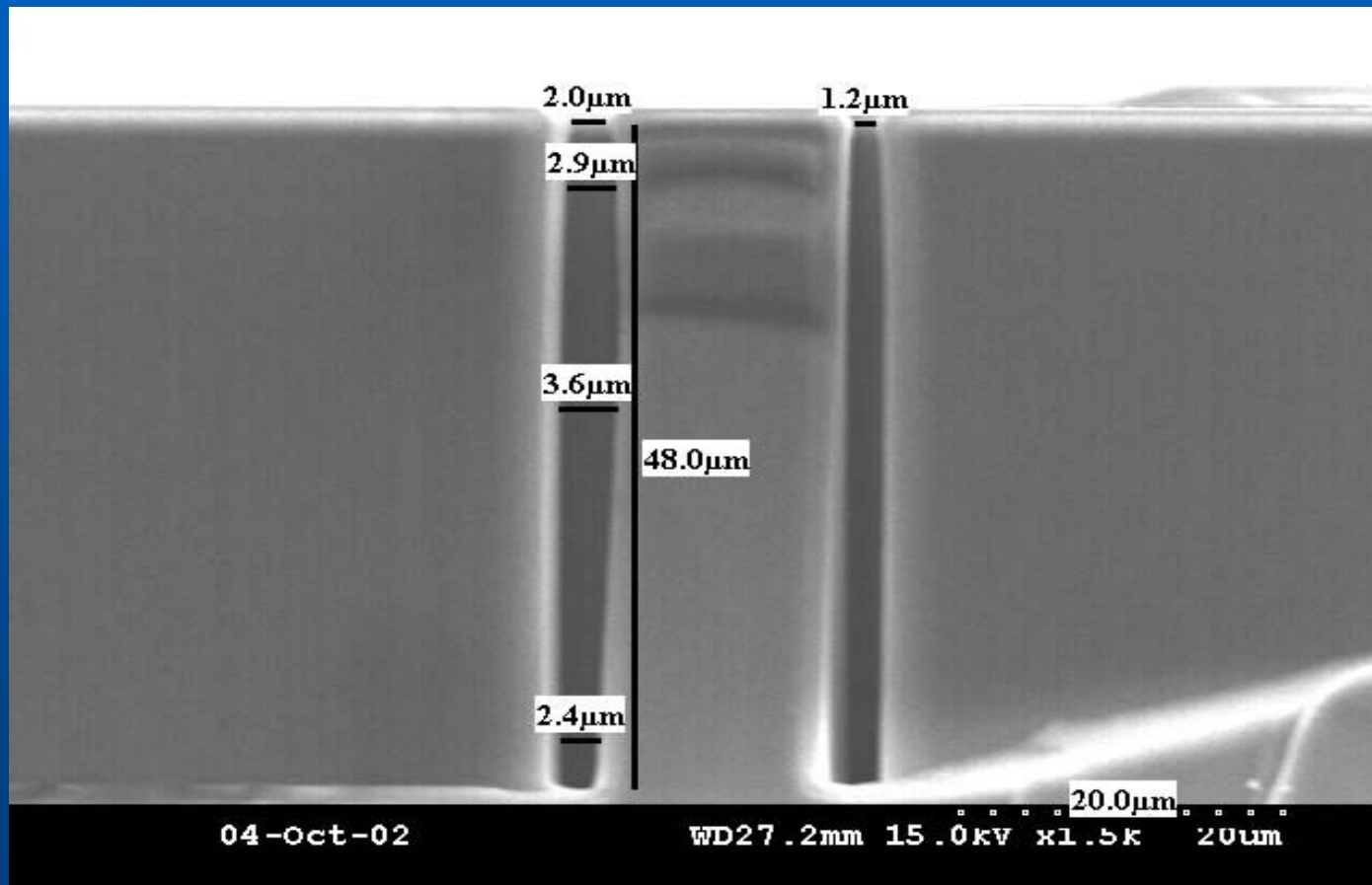
DRIE Overall

- **Expensive Technology**
- **Good for feature resolution in thin film structures**
- **Good for vertical sidewalls for deep etching techniques in the substrate**
- **Well used for MEMS fabrications**

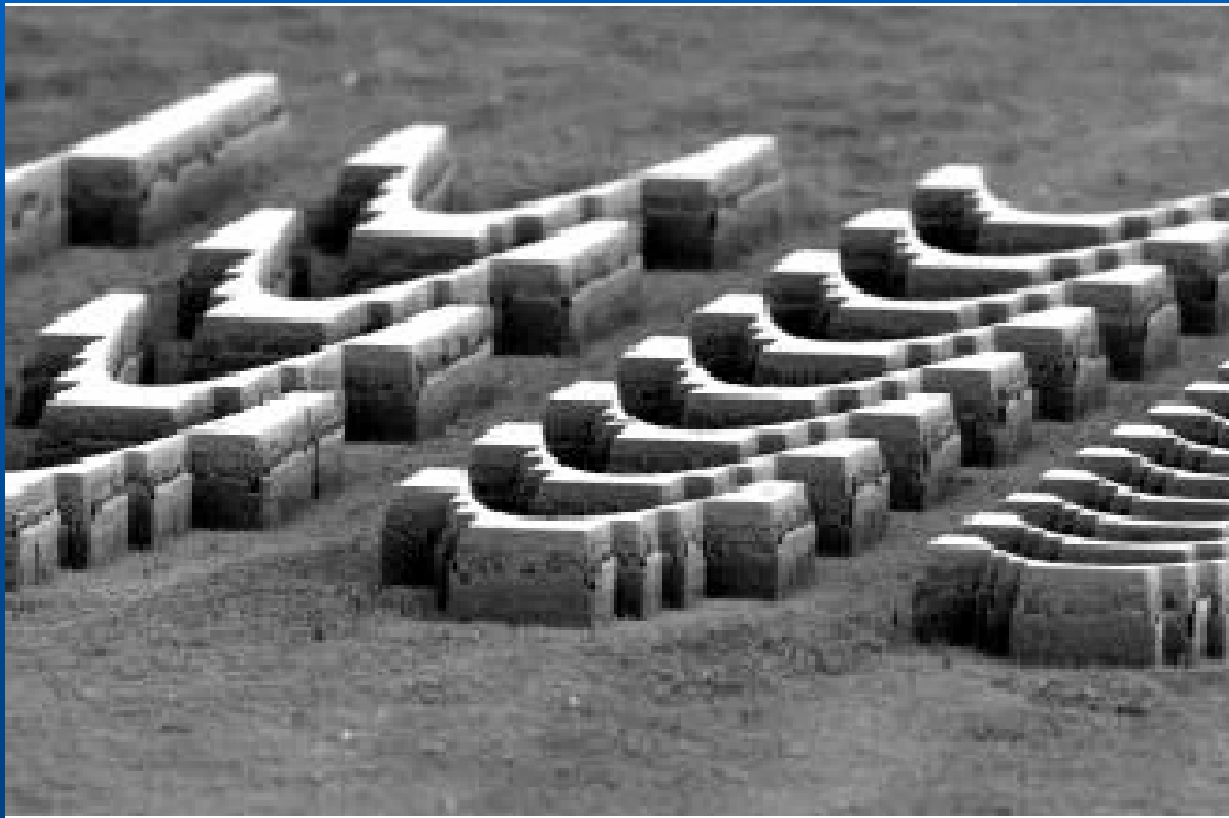
Etching at MIRC Using STS ICP



Etching at MIRC, Cont'd



Etching Example, Cont'd



Conclusions

- **With DRIE:**
 - ❖ Etching aspect ratios of 50:1 can be achieved
 - ❖ Etch rates are 3-4 times higher than wet etching
 - ❖ Widely used for MEMS fabrications

Questions

QUESTION