

BIOLOGICAL FRAMEWORKS FOR ENGINEERS

Session #12 [nm: Micro and Nano Fabrication]

General Objectives:

- ✓ Introduction to microelectronics, microfabrication, and nanotechnology
- ✓ Identify ways that biology can be better understood with small tools

Central Framework:

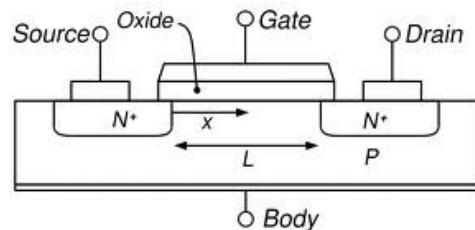
- ✓ Engineering and physics has enabled tools that are able to manipulate objects at the micro and nanoscale

Session Outline:

I. Transistor

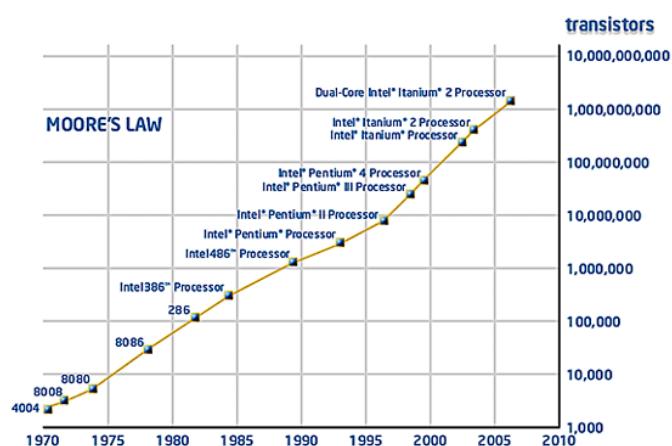
a. Vacuum tubes

b. Solid State Transistor



II. Integrated Circuits

III. Moore's Law



IV. Microelectronic Processes

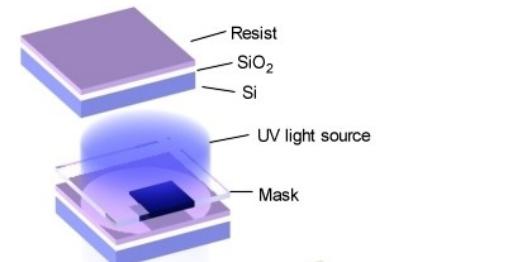
- a. Czochralski Process
- b. Oxide Growth
- c. Lithography
- d. Ion Implantation
- e. Thin Film Deposition
- f. Chemical Etching
- g. Chemical-Mechanical Polishing (CMP)

V. Microfabrication

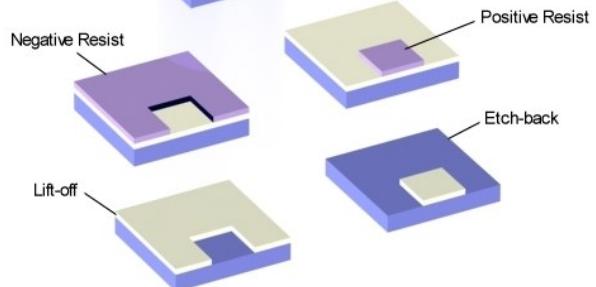
- a. Bulk Micromachining
- b. Surface Micromachining

VI. Lithography

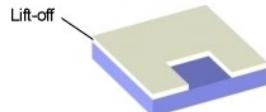
a. Patterning



b. Positive Resist



c. Negative Resist



VII. Soft Lithography

a. SU-8

b. Polydimethylsiloxane

c. Apps

VIII. Cell tools

IX. Nanotechnology

a. Nanolithography

b. Molecular Assembly

c. Nanomaterials