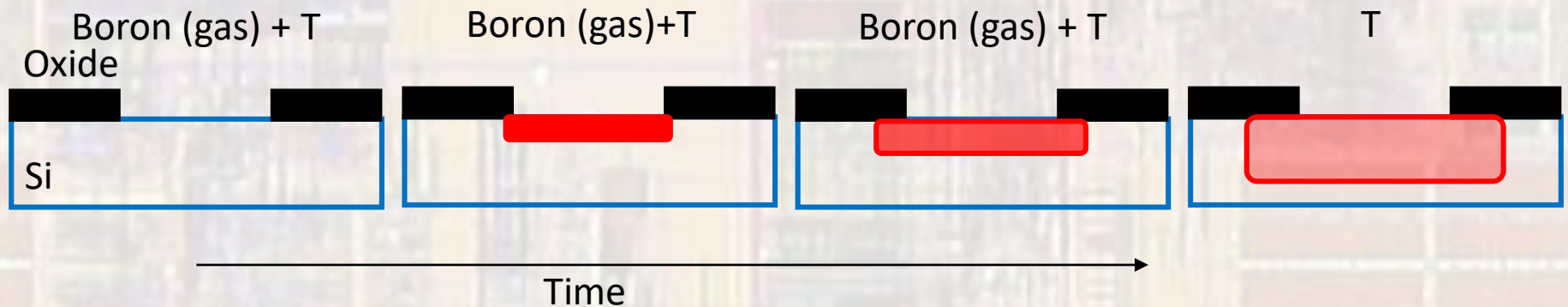


# Diffusion

Last updated 3/7/19

# Diffusion

- Diffusion
  - The tendency of any group of mobile particles to, on average, expand
    - Physics example of smoke in 1/2 of a box – diffusing to the whole box when the divider is removed
    - Enhanced by temperature
  - Used to expand the area occupied by dopants in a semiconductor



# Diffusion

- Diffusion
  - Used to create n/p type regions in most devices
  - May not be the original source for the dopants (see Ion Implantation)
  - The process is problematic because early diffusions are impacted by any later processing that uses elevated temperatures

# Diffusion

- Diffusion material sources
  - Gas
    - $\text{PH}_3$  or  $\text{B}_2\text{H}_6$
  - Solids
    - Evaporation causes some of the material to become gaseous
  - Liquid
    - $\text{POCl}_3$