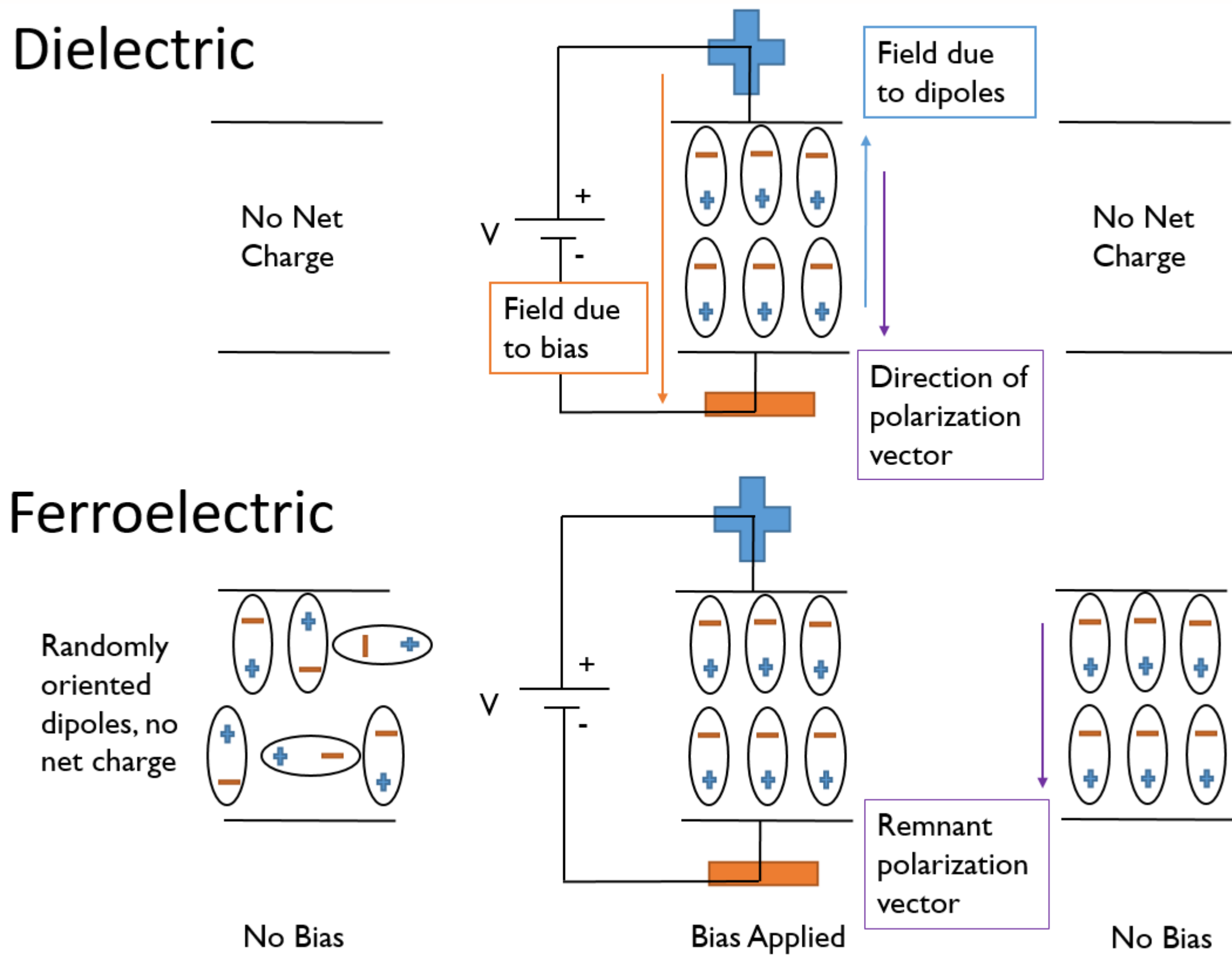


Atomic Layer Deposition of Ultra-Thin Ferroelectric Materials

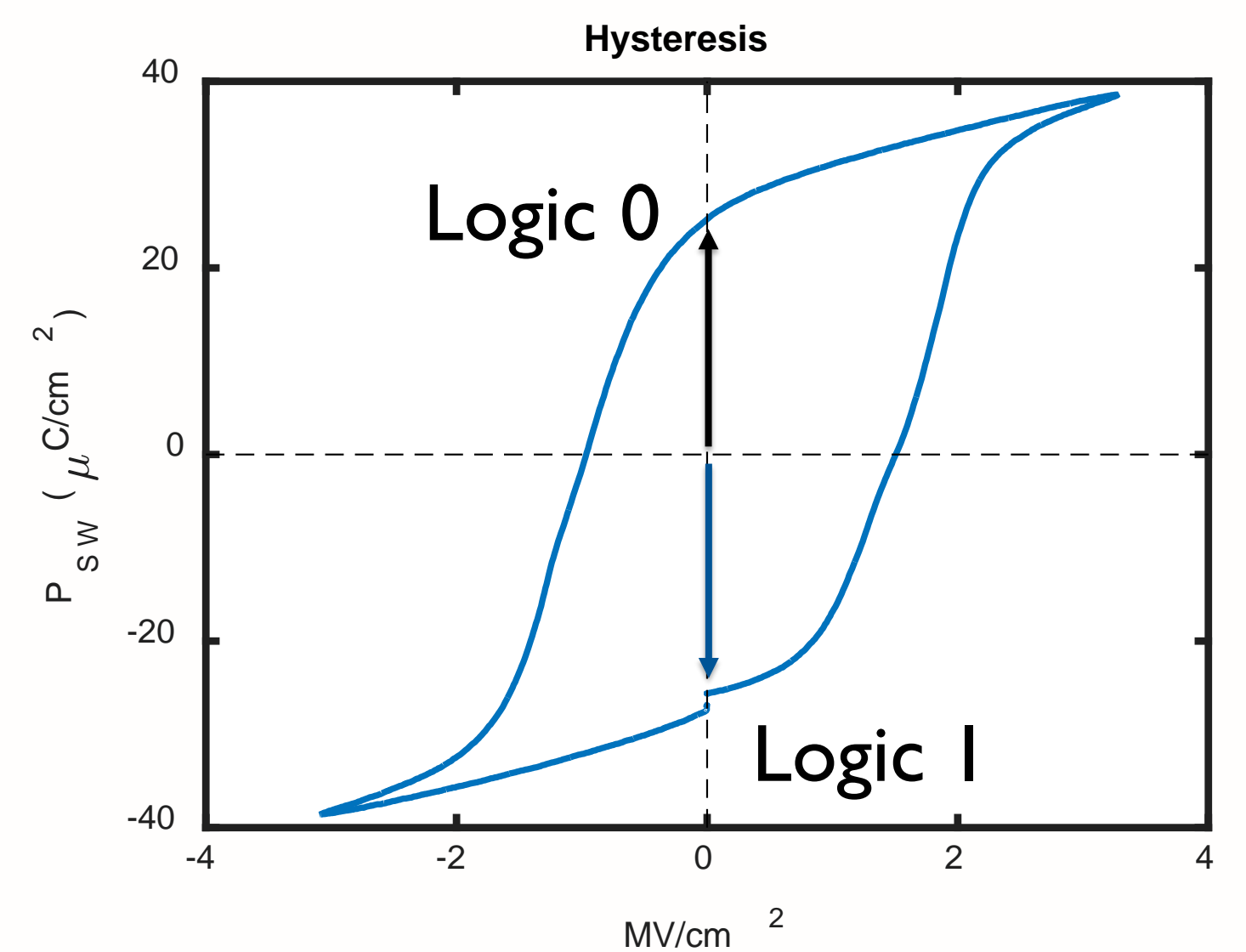
Glen Walters, ECE department, Advisor: Dr. Toshikazu Nishida

Q:What is a ferroelectric material?

A: A material that exhibits a polarization in the absence of an electric field, but can be reversed by the application of an opposite polarity field.



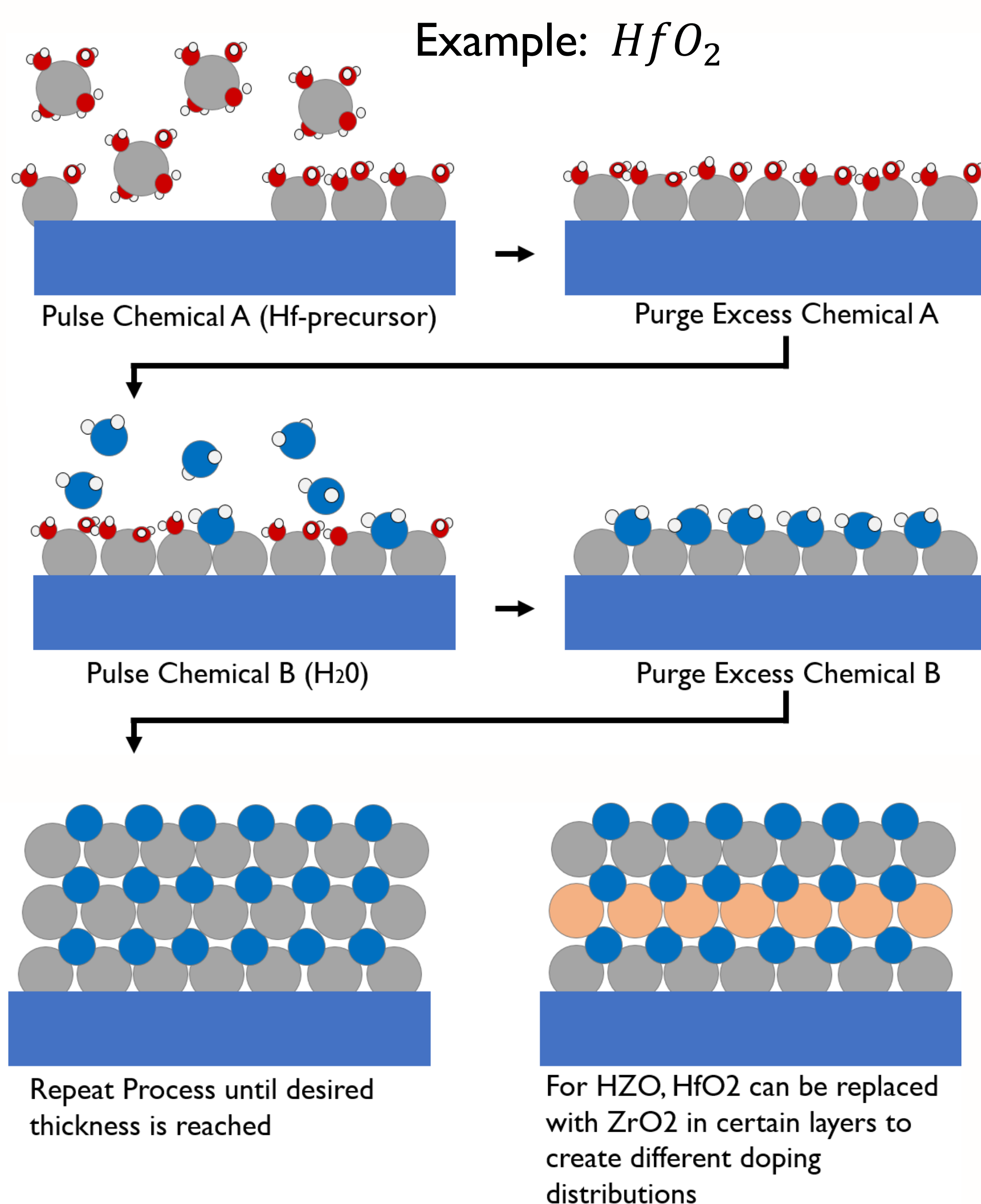
Ferroelectric Random Access Memory (FRAM) utilizes the polarization state to store a logical 0 or 1.



Measured charge vs applied voltage

Q:What is Atomic Layer Deposition?

A: A deposition technique which utilizes a self-limiting chemical reaction to create a film layer by atomic layer.

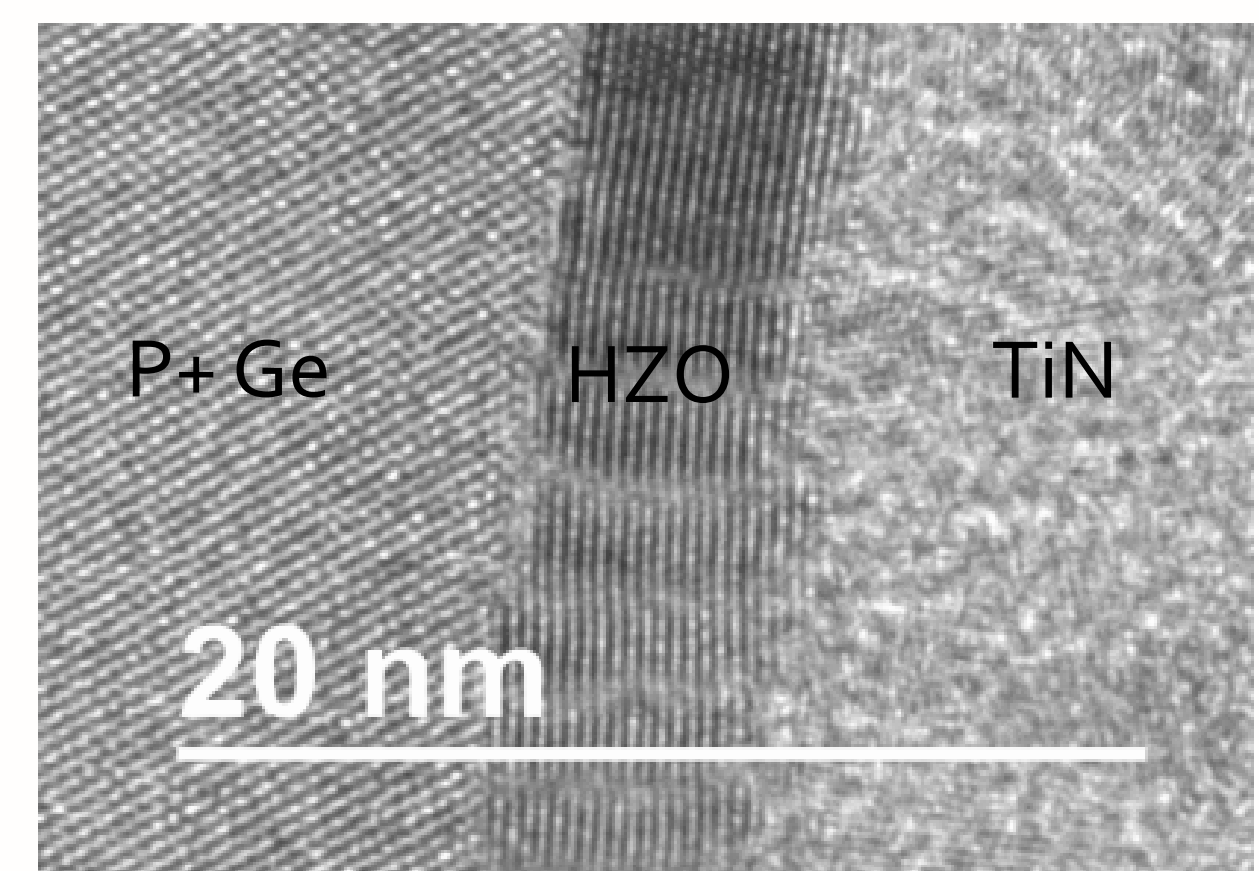


Advantages of ALD

- Self-limiting: precursor gas will not react with itself, allowing for precise layering as opposed to CVD or Sputtering.
- High Aspect Ratio: Precursor gases can diffuse into deep and narrow trenches.
- Doping control: Highly intricate doping can be achieved through layering.

Disadvantages of ALD

- Time: Can be time intensive for thin films and unrealistic for thicker films.



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