Epitaxy

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Epitaxy

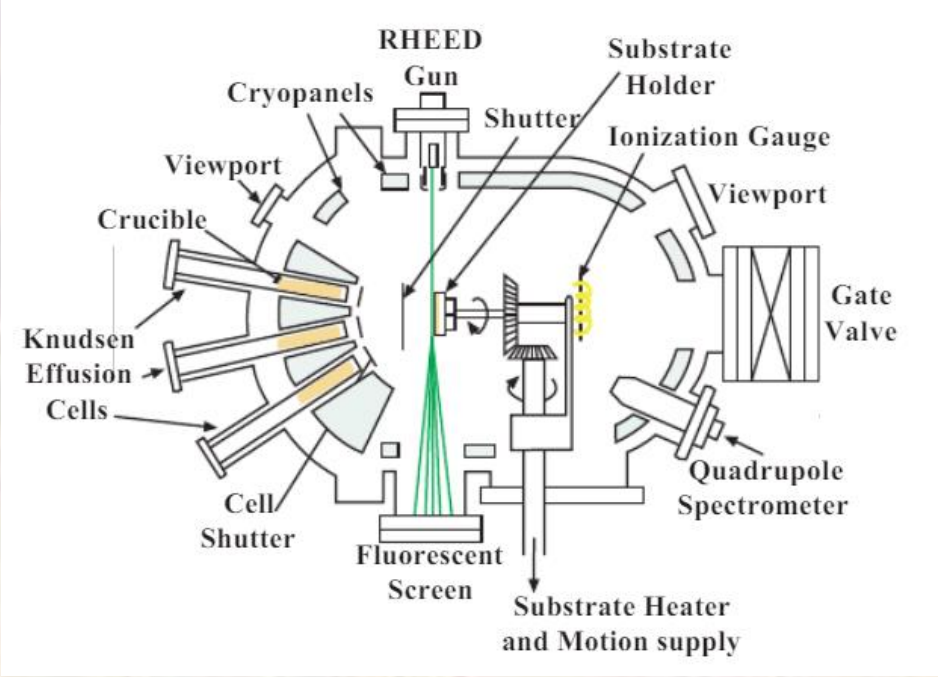
- Epitaxy
  - The growth of single crystal material into a crystalline substrate
- Homoepitaxy
  - Growth where both materials are the same
- Heteroepitaxy
  - Growth where the two materials are different
  - Can cause issues if the crystal spacings are different

Epitaxy

- Why Epitaxy in Semiconductors
  - Higher quality crystal structure
    - Fewer defects
    - More pure
  - Doped epitaxy allows for very abrupt junctions
    - Introduce a dopant into the epitaxy process
  - Heteroepitaxy
    - Special devices based on III-V elements can be built
    - LEDs, Lasers, Power devices

Epitaxy

- Molecular Beam Epitaxy
  - Epitaxy material is evaporated into a very high vacuum
  - The material coalesces onto the substrate
  - Can be very well controlled
    - ~ 1 atomic layer of accuracy



src: Moressi, L, Basics of Molecular Beam Epitaxy (MBE) technique