Silicon Wafer Production

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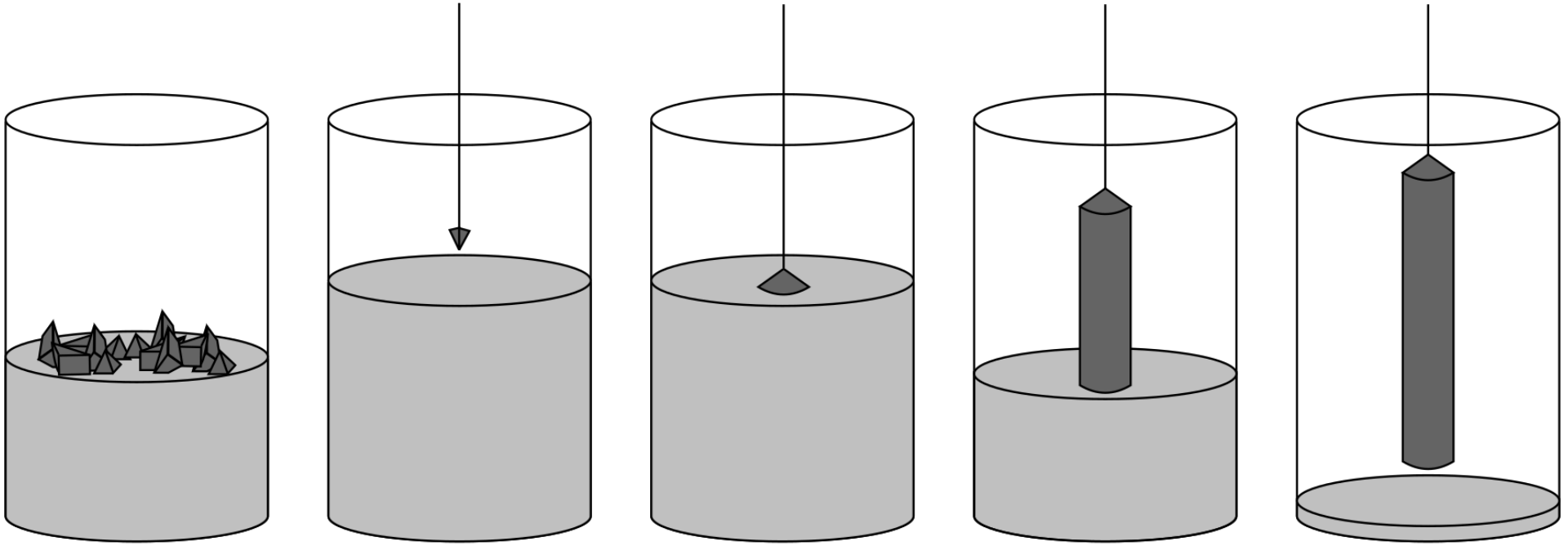
https://www.youtube.com/watch?v=AMgQ1-HdElM

Silicon Wafer Production

The time it takes to grow a silicon ingot varies, depending on many factors. More than 75% of all single crystal silicon wafers grow via the Czochralski (CZ) method. CZ ingot growth requires chunks of virgin polycrystalline silicon. These chunks are placed in a quartz crucible along with small quantities of specific Group III and Group V elements called dopants. The added dopants give the desired electrical properties for the grown ingot. The most common dopants are boron, phosphorus, arsenic, and antimony. Depending on the dopant, the ingot becomes a P or N type ingot (boron: P type; Phosphorus, antimony, arsenic: N type).

The Czochralski method



Melting of polysilicon, doping

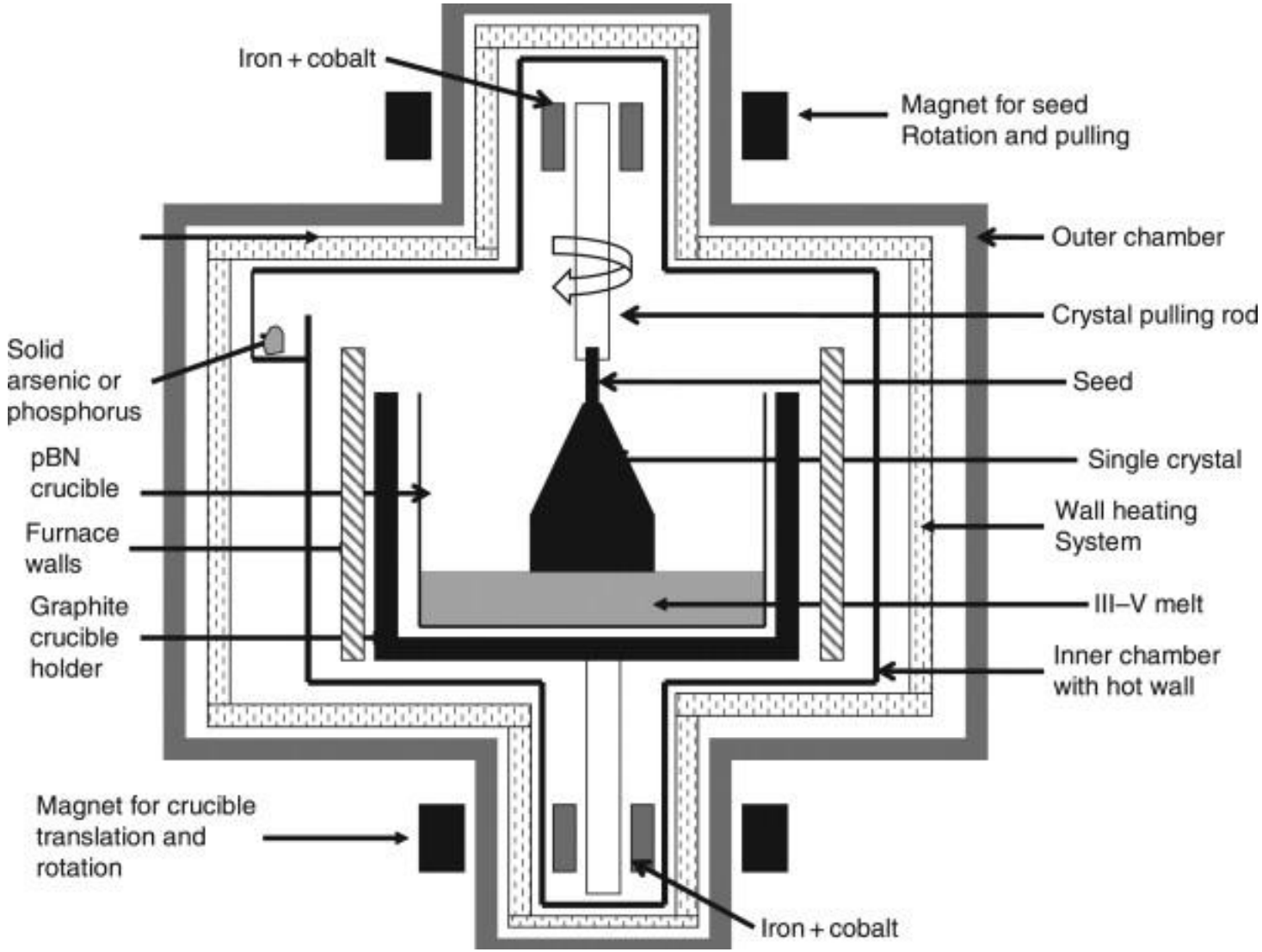
Introduction of the seed crystal

Beginning of the crystal growth

Crystal pulling

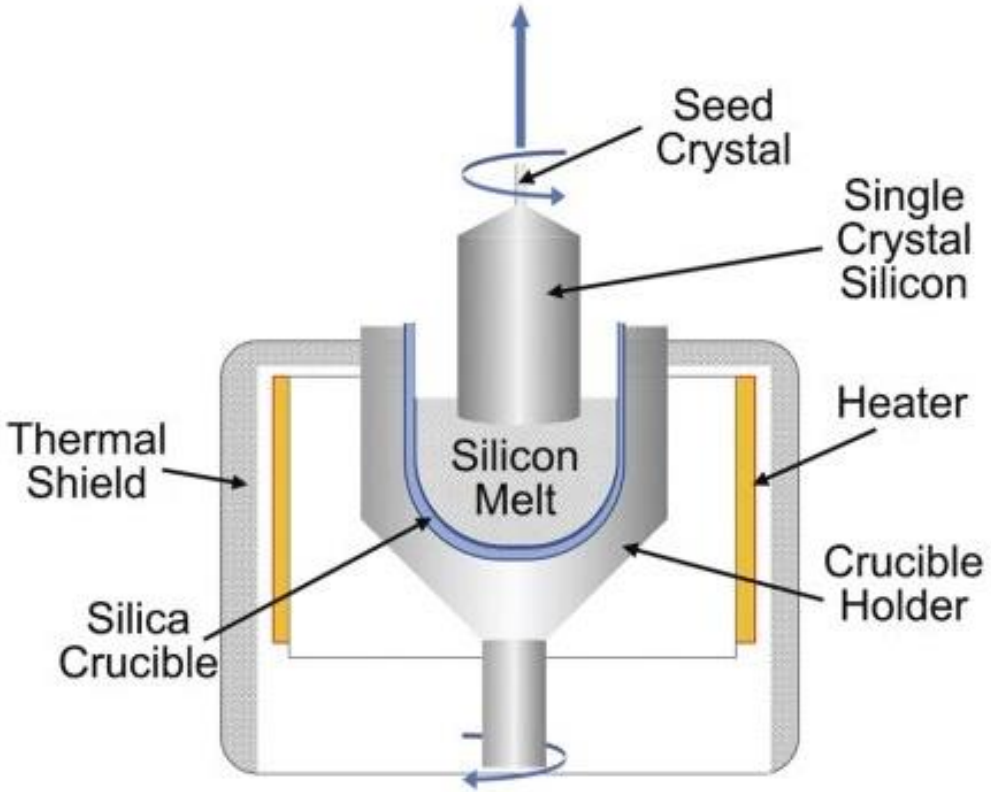
Formed crystal with a residue of melted silicon

The Czochralski method



Silicon Wafer Production

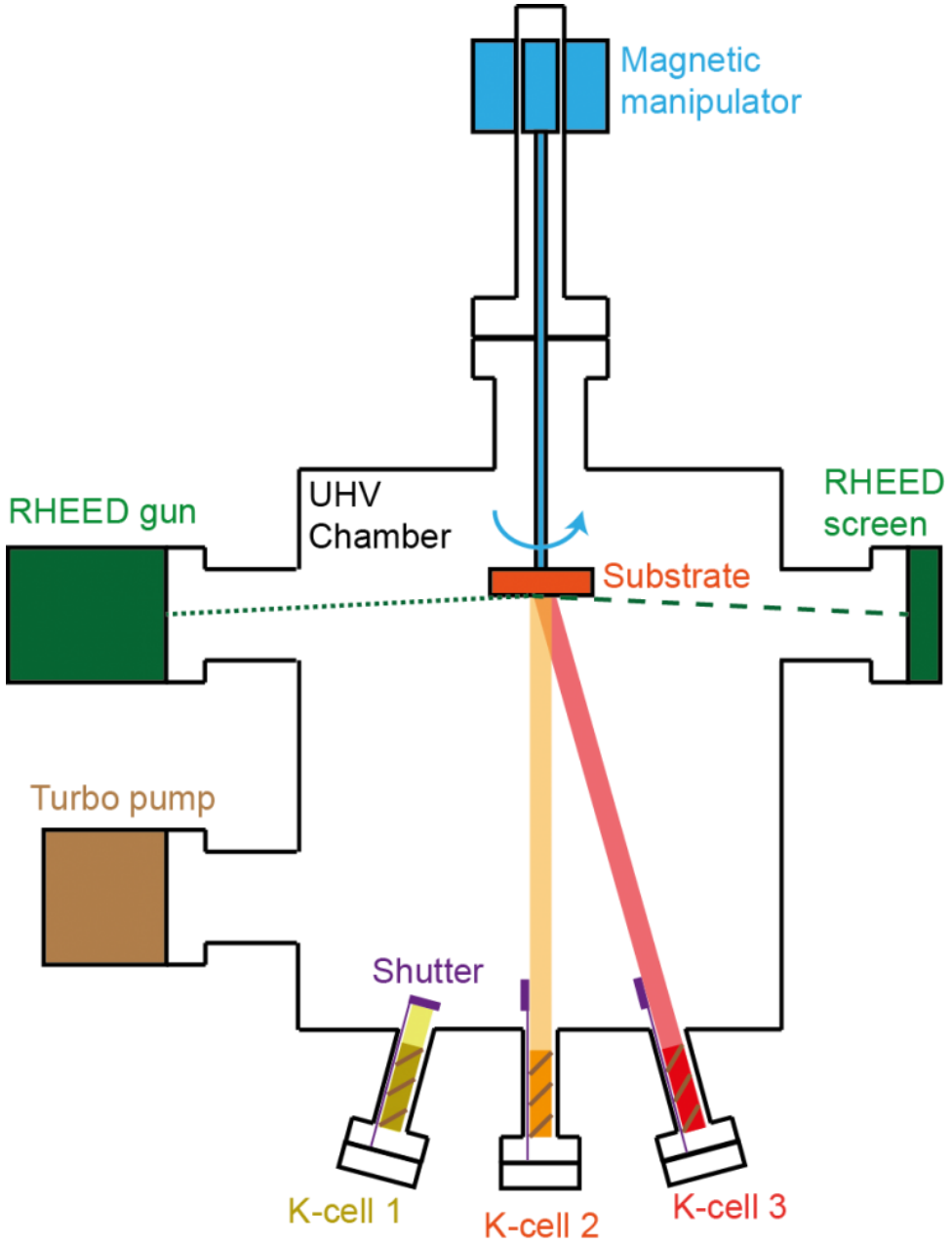
Ingot Growth



Silicon Wafer Production Process

https://www.sas-globalwafers.co.jp/eng/products/wafer/process.html

Molecular Beam Epitaxy (MBE)



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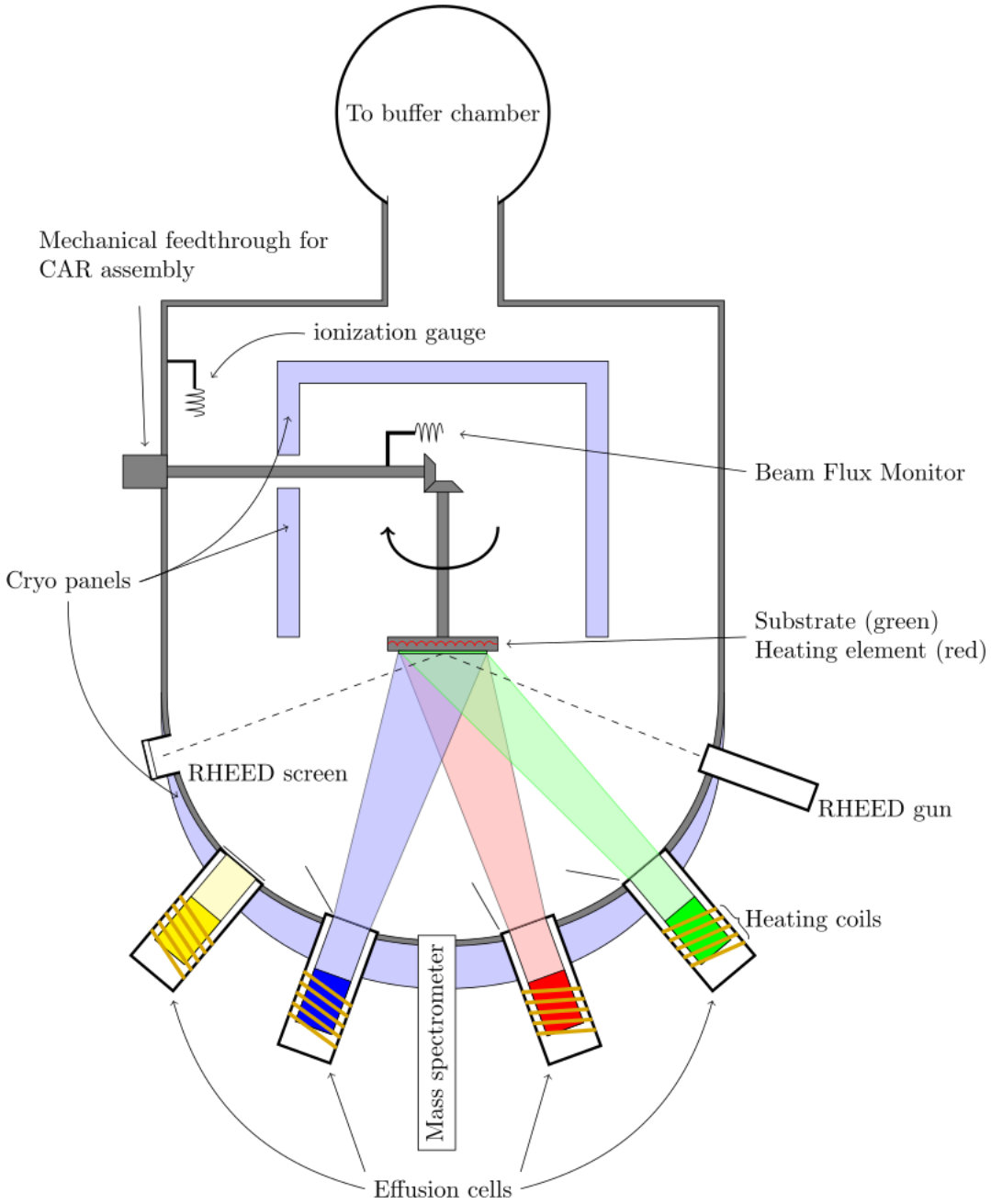

Assignment

- Silicon Wafer Production (The Czochralski method)
- Molecular-beam epitaxy