Exercise 6: Bulk MEMS

return DL 26.4.2023 by 10 pm
(note: Wednesday evening)

Instructions for process flows

Process flow step-by-step is a list of operations that are done to the wafer, and in the end the desired devices results.

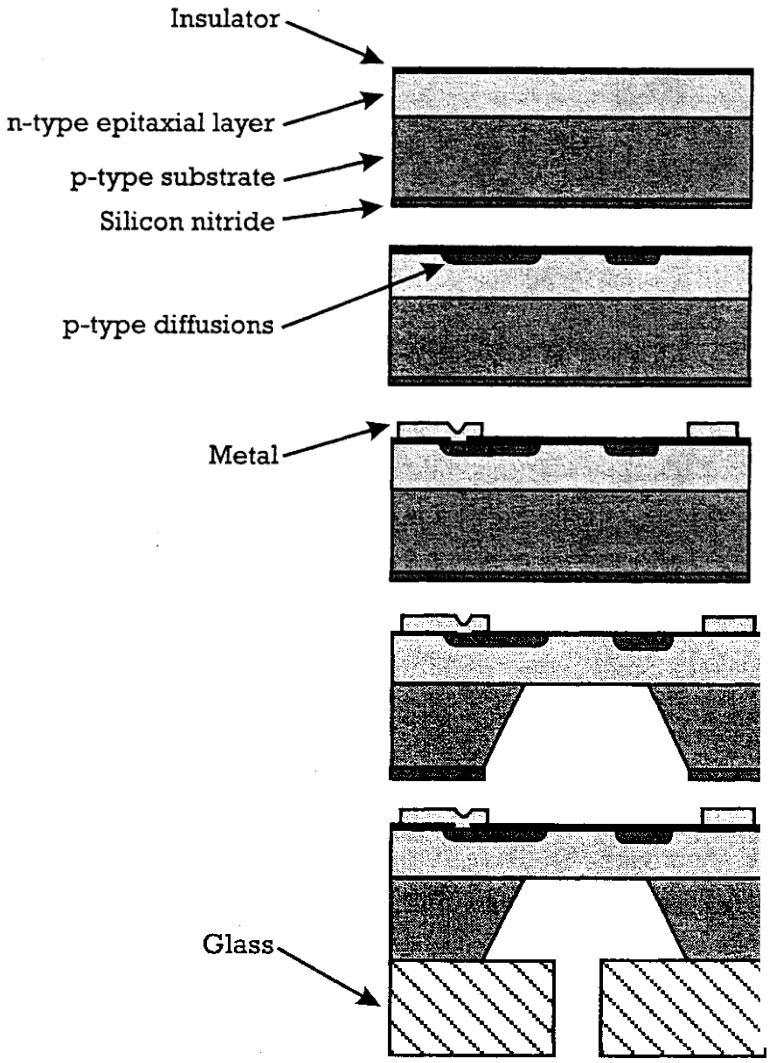
It starts by wafer selection: you need to consider silicon wafer thickness, doping, polishing (SSP or DSP), or if epi- or SOI wafer is used etc.
1. Choose 500 µm thick DSP wafer of p-type doping, 1015 cm-3

The you list each individual step in a list format (a numbered list):
2. Thermal oxidation (grows on both sides)
3. Lithography
4. Oxide etching in HF (oxide on backside is also etched away)
5. …

Think of a process flow as an instruction sheet that you give to a lab technician. S/he will carry out steps in the very order you wrote.

Lithography is a single step: do not explain spinning, baking, exposure … separately in this type of a question.

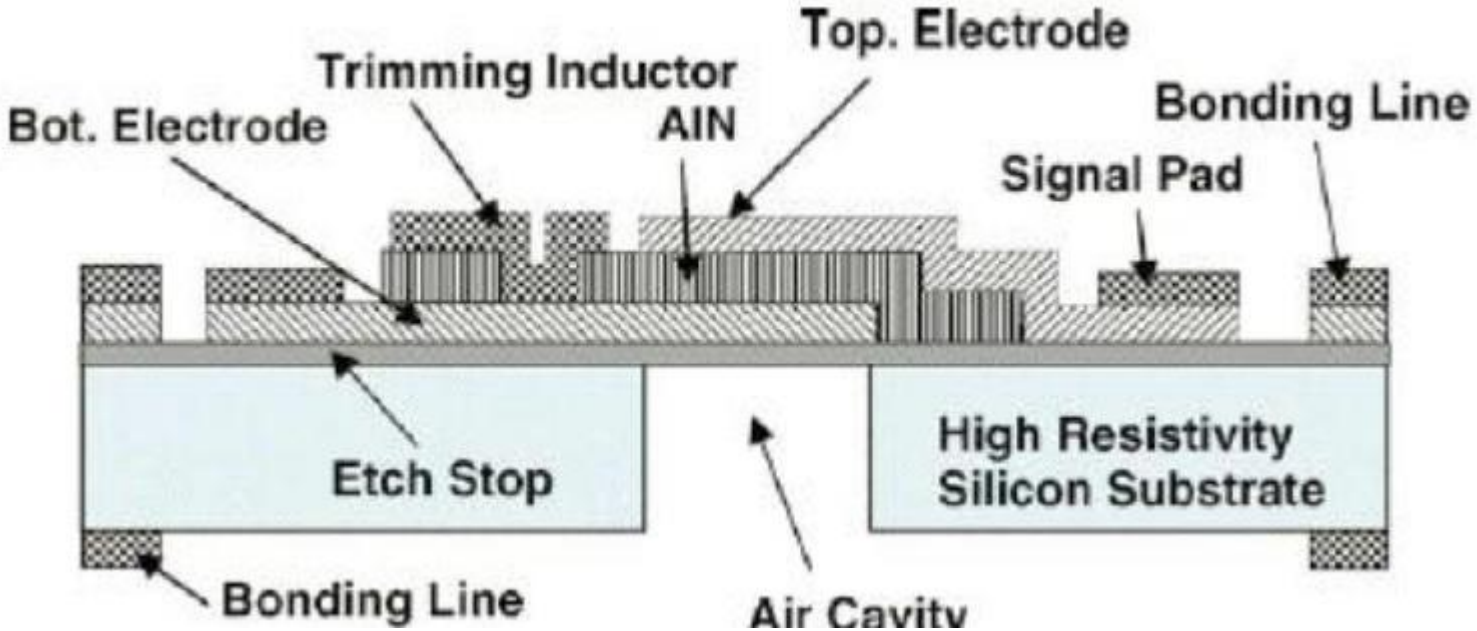
Q1: pressure sensor



Work pout the detail fabrication sequence of this piezoresistive pressure sensor and give commentary on the fabrication process details, identify materials, diffusion depths and film dimensions etc.

Q2: BAW resonator

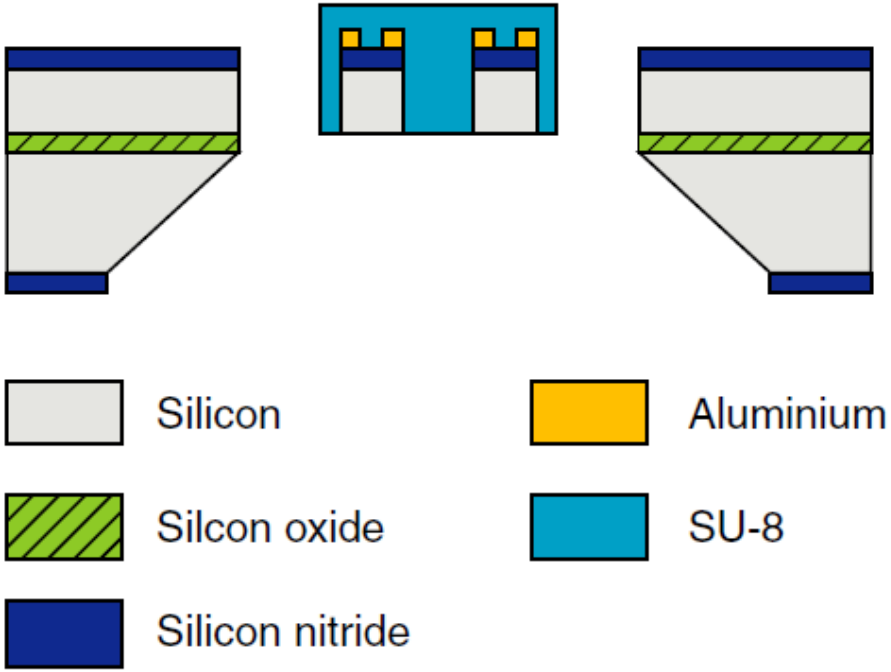
Explain step-by-step the fabrication of this resonator. Add detail as you can.

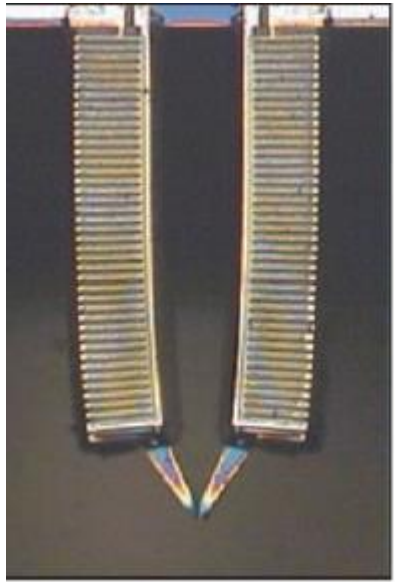


Q3: Microgripper

Explain step-by-step the fabrication of this resonator.

Note that in reality aluminum is not perfectly aligned to nitride and silicon edge !





SU-8: negative photoresist, spin coated, thermally and mechically stable

Q4: silicon grating with 60:1 AR

Explain step-by-step the fabrication of this resonator.
Pay special attention to which side is processed first.