

MOSFET Theory (H.5)

20151218

nMOS Energy Band Diagrams

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Background in Energy Band Theory

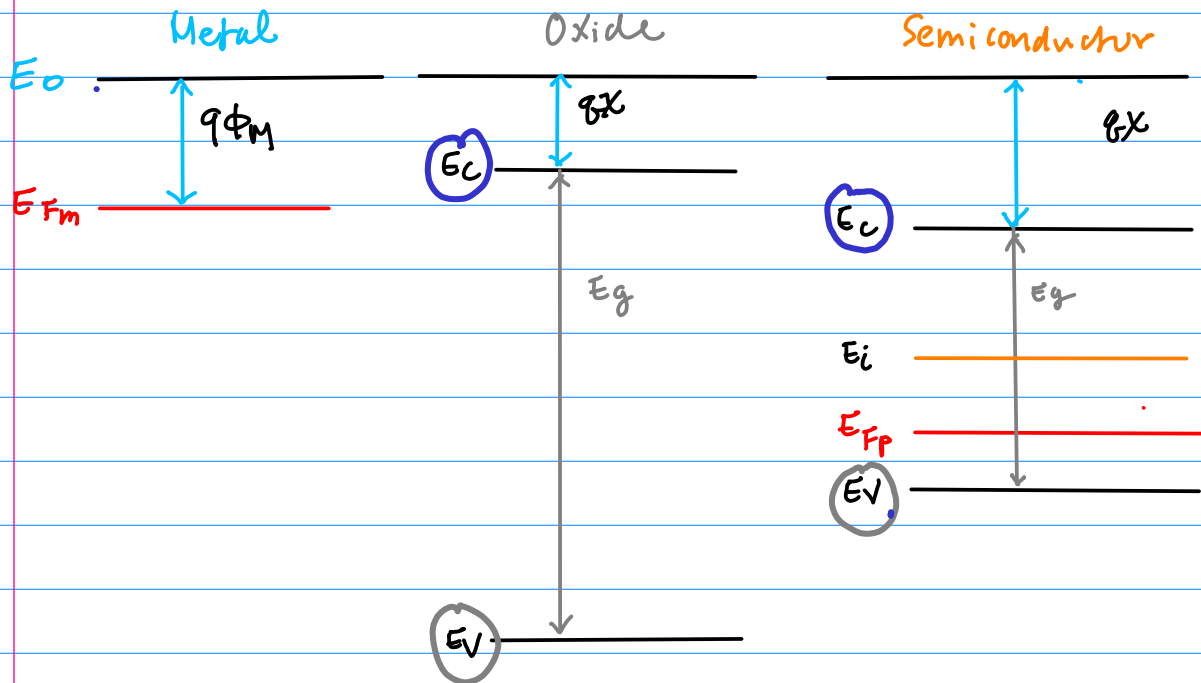
See the following files

http://www.doe.carleton.ca/~smcgarry/ELEC3908/Slides/ELEC3908_Lect_3.pdf

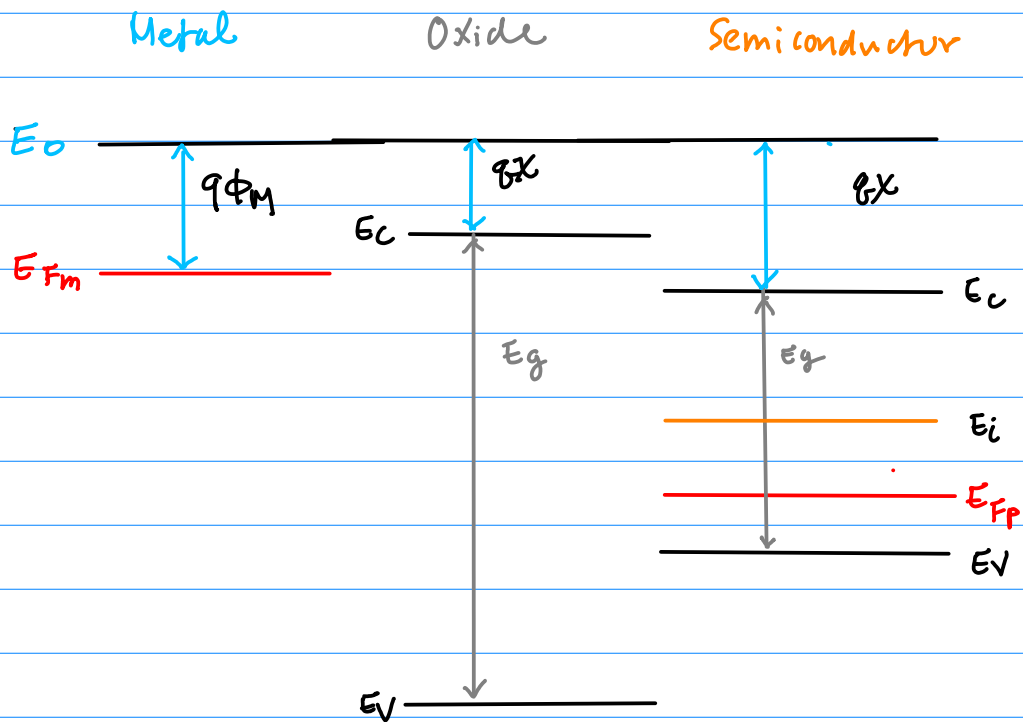
http://www.csee.wvu.edu/~dwgraham/classes/ee551/slides/semiconductor_overview.pdf

The probability that an electron occupies an electronic state

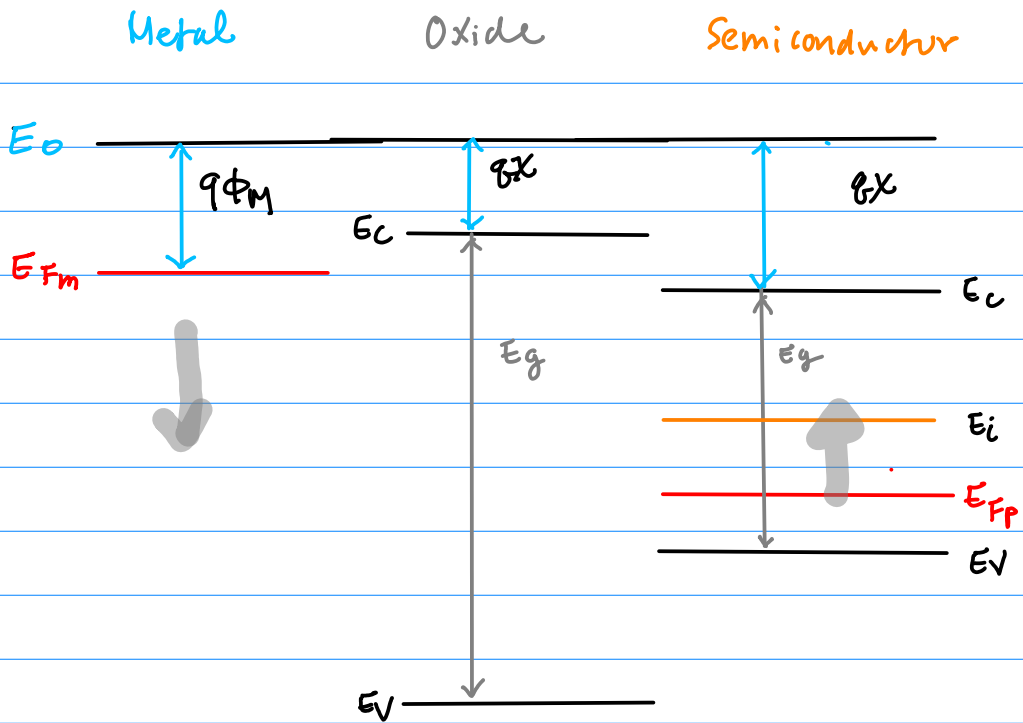
Separation



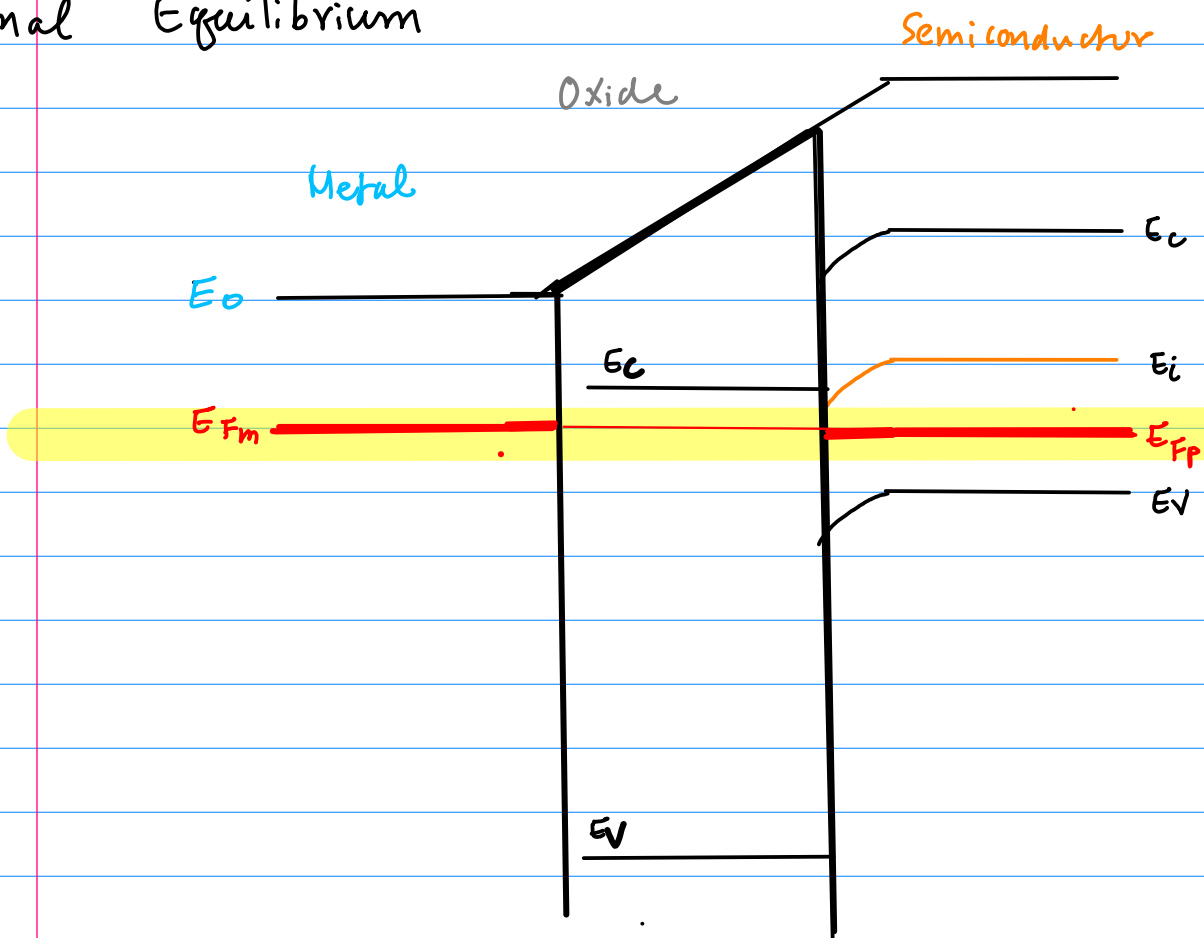
Initial Contact



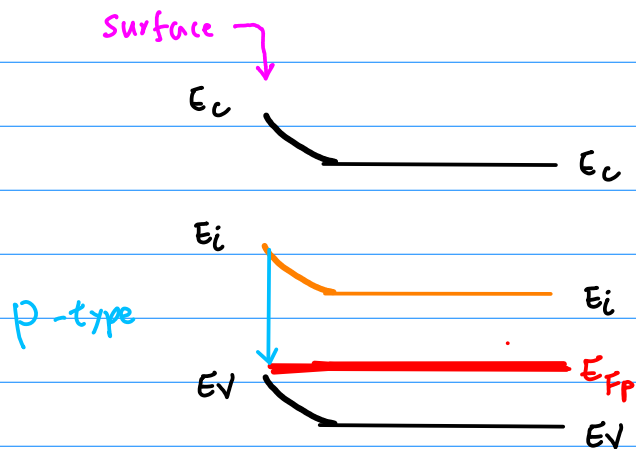
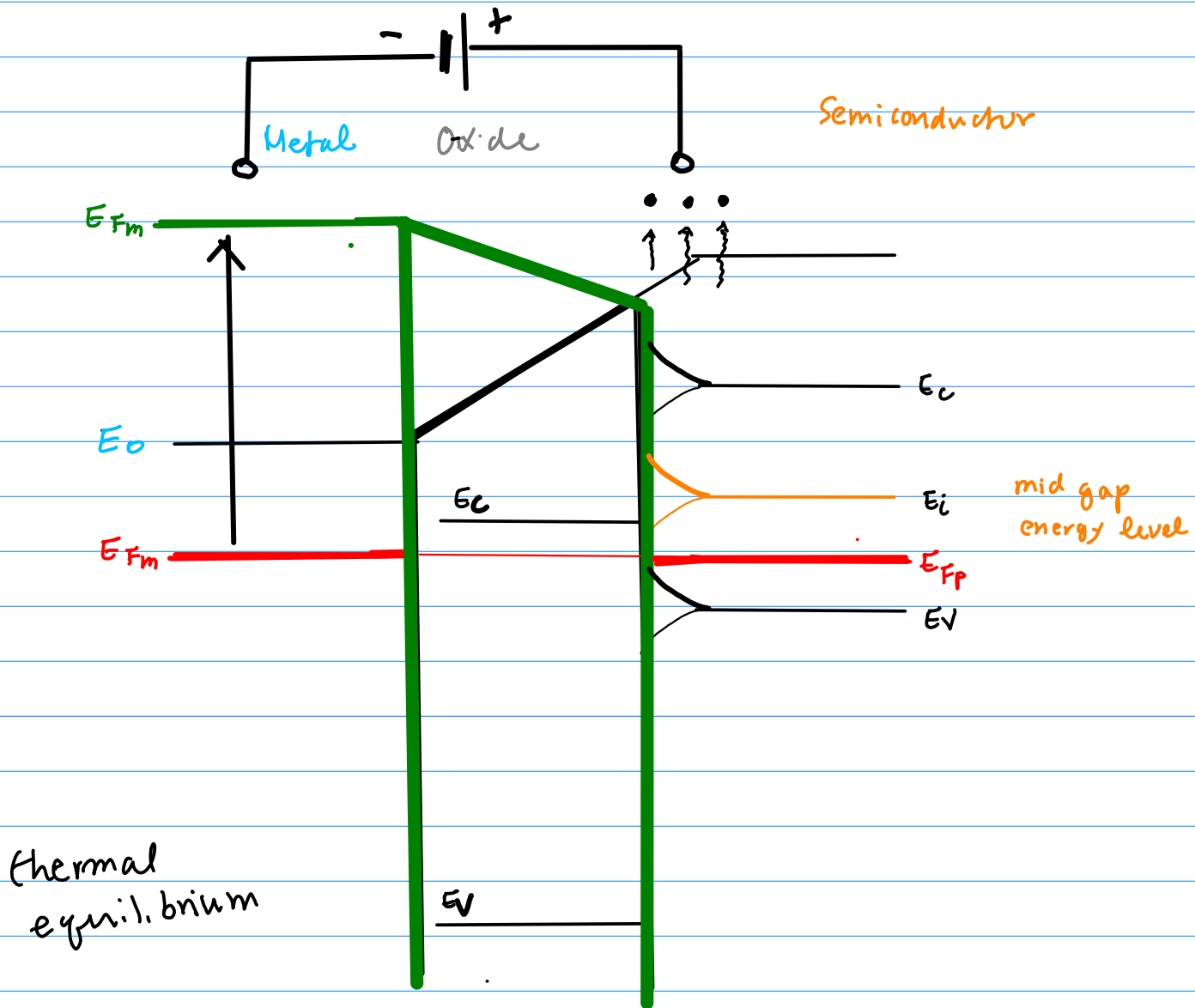
Initial Contact



Thermal Equilibrium

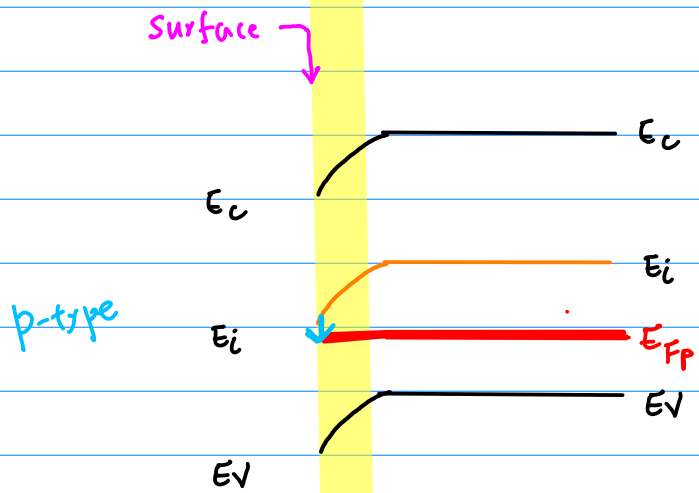
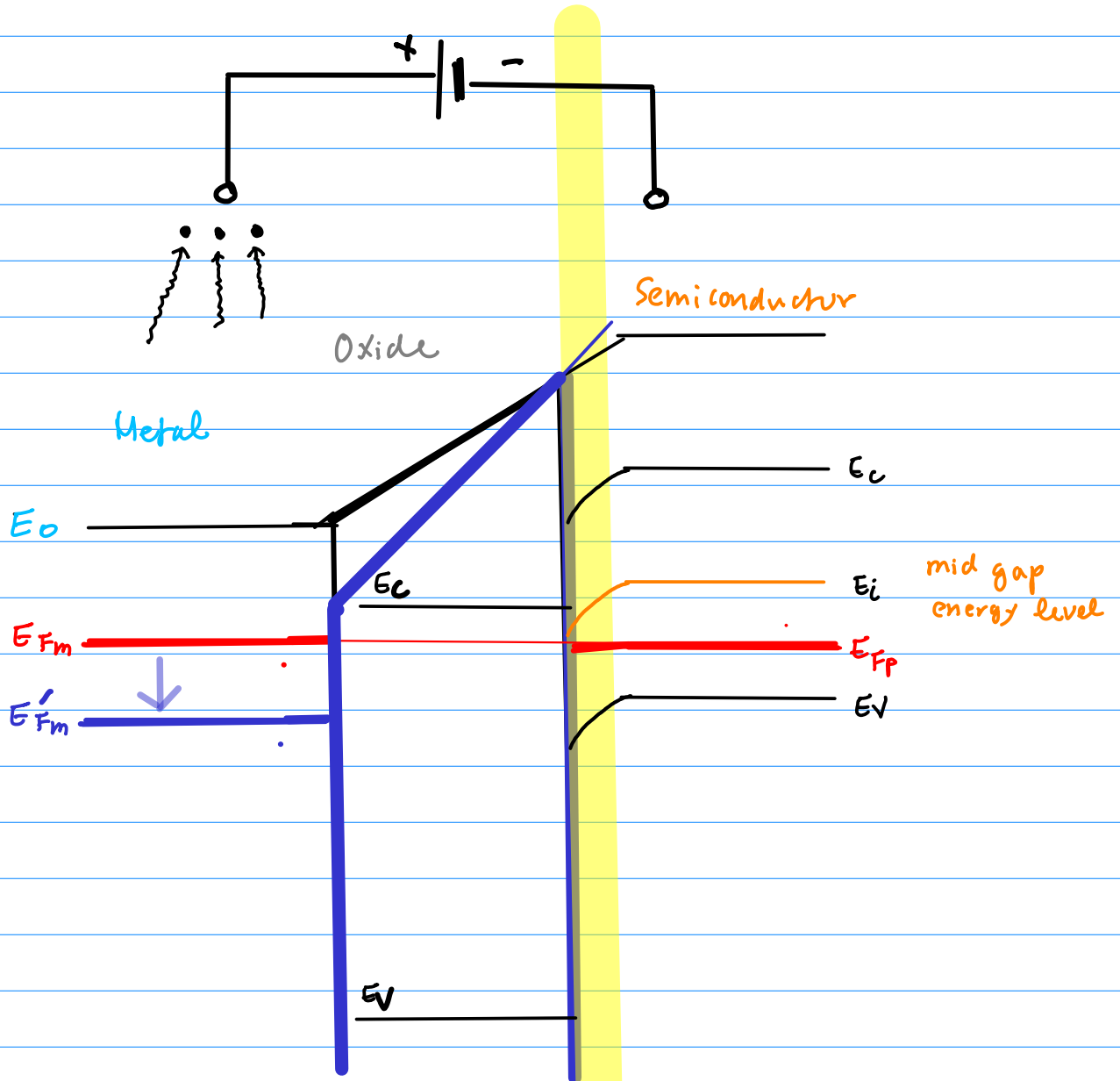


① Accumulation ... attracts holes



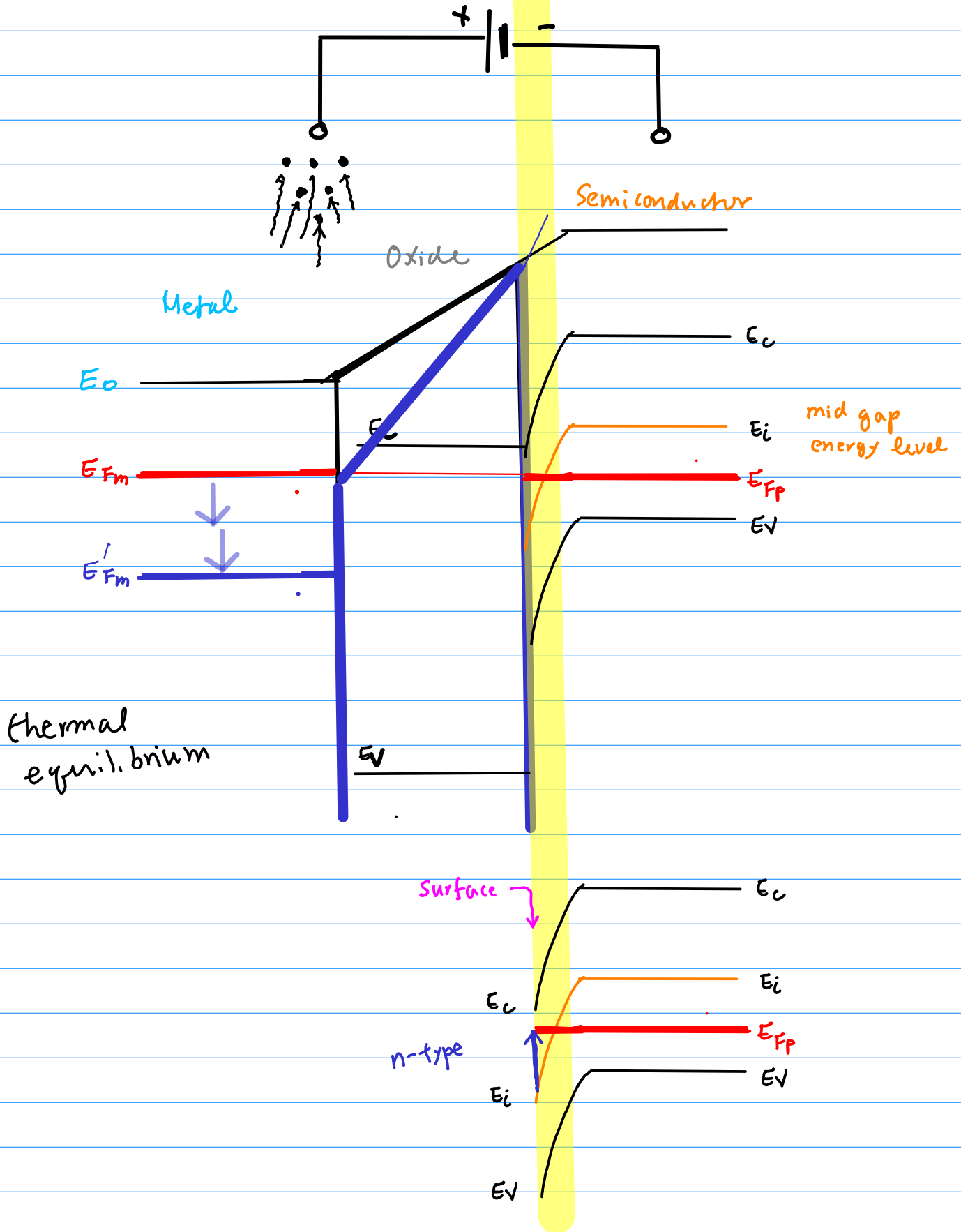
② Depletion

repels holes

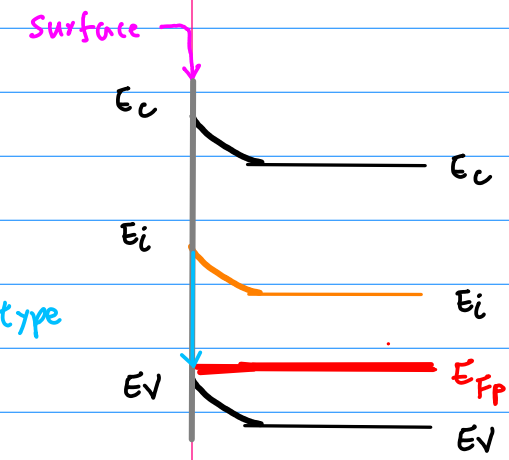


③ Inversion

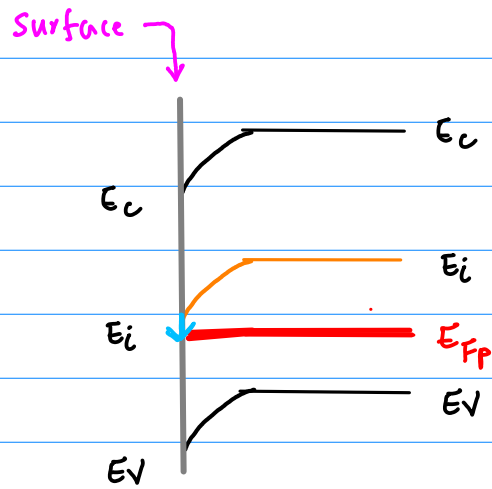
repels holes
attracts electrons



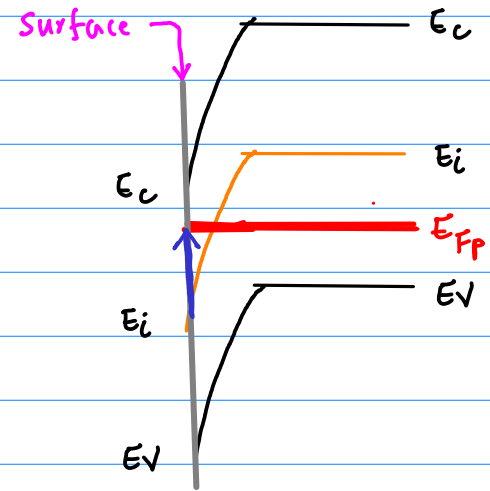
* accumulation



* depletion



* inversion



References

Some Figures from the following sites

[1] <http://pages.hmc.edu/harris/cmosvlsi/4e/index.html>
Weste & Harris Book Site

[2] en.wikipedia.org

[3] Uyemura, Introduction to VLSI Circuits and Systems

