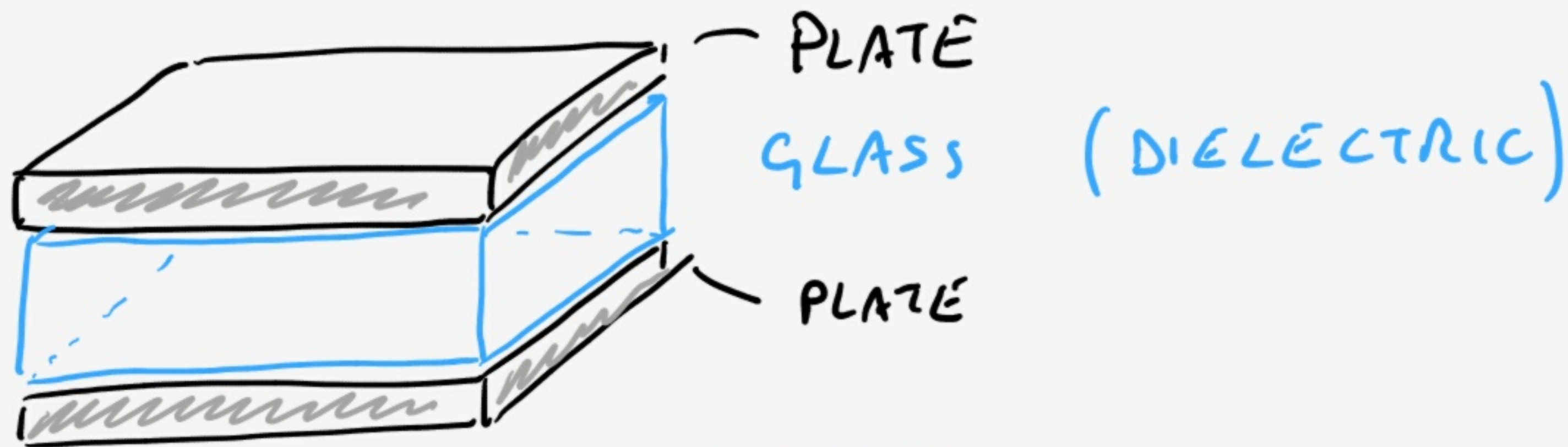


ASSIGNMENT #1

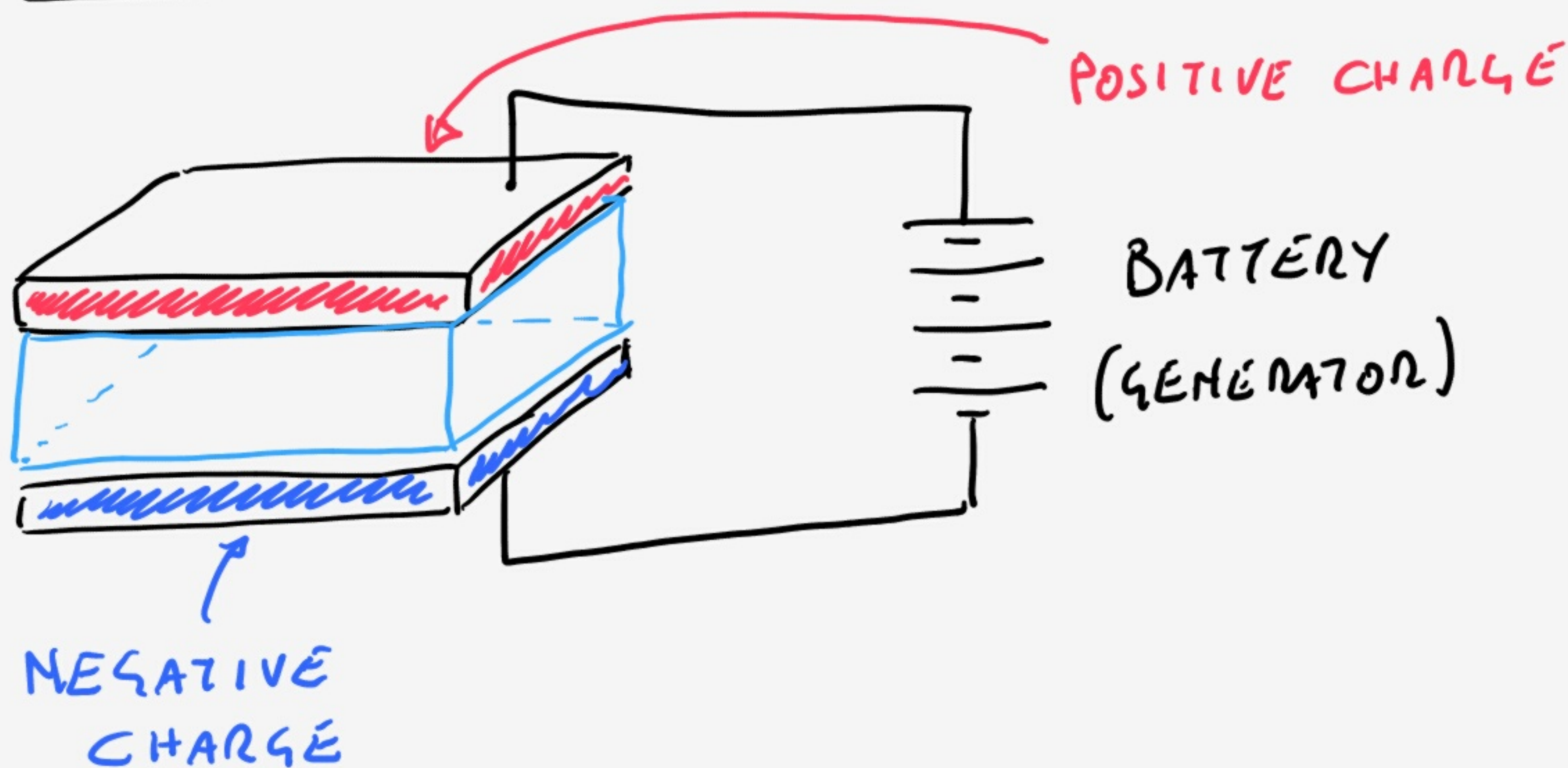
Where does this charge come from?

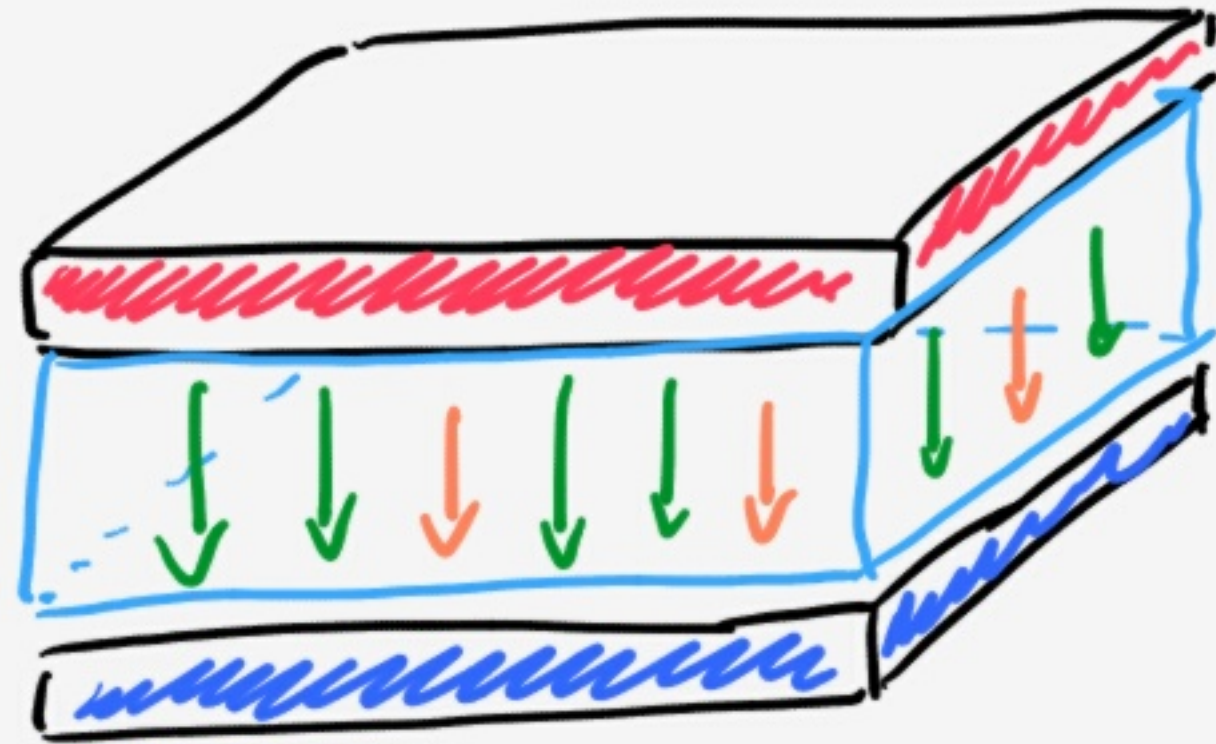
1. A flat plate capacitor is filled with a dielectric slab made out of glass (dielectric relative constant of about 5) as shown in figure.
2. The capacitor is connected to a generator which sets the difference of potential between the plates by accumulating positive charge on one plate and negative charge on the other plate.
3. As a consequence of the external electric field, a polarization field is established in the dielectric.
4. The capacitor is then disconnected from the generator and thus the charge is trapped on the plates.
5. The capacitor is dismantled and the plates are completely discharged by grounding both of them. No residual charge is present on the plates.
6. After discharging the plates, the capacitor is reassembled and not connected to any generator. No friction or force has been applied.
7. We would expect that zero difference of potential is present between the plates so, as a counterproof, we connect two plates of the capacitor with a wire and a spark occurs.... So the difference of potential is not zero
8. ... WHY ?

Try to give yourself the best explanation and if you believe it it's likely correct...

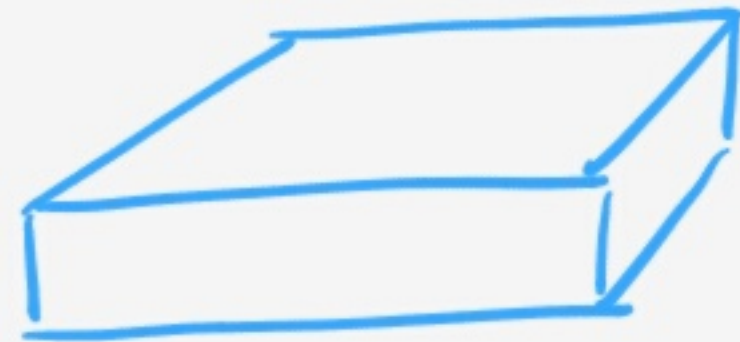
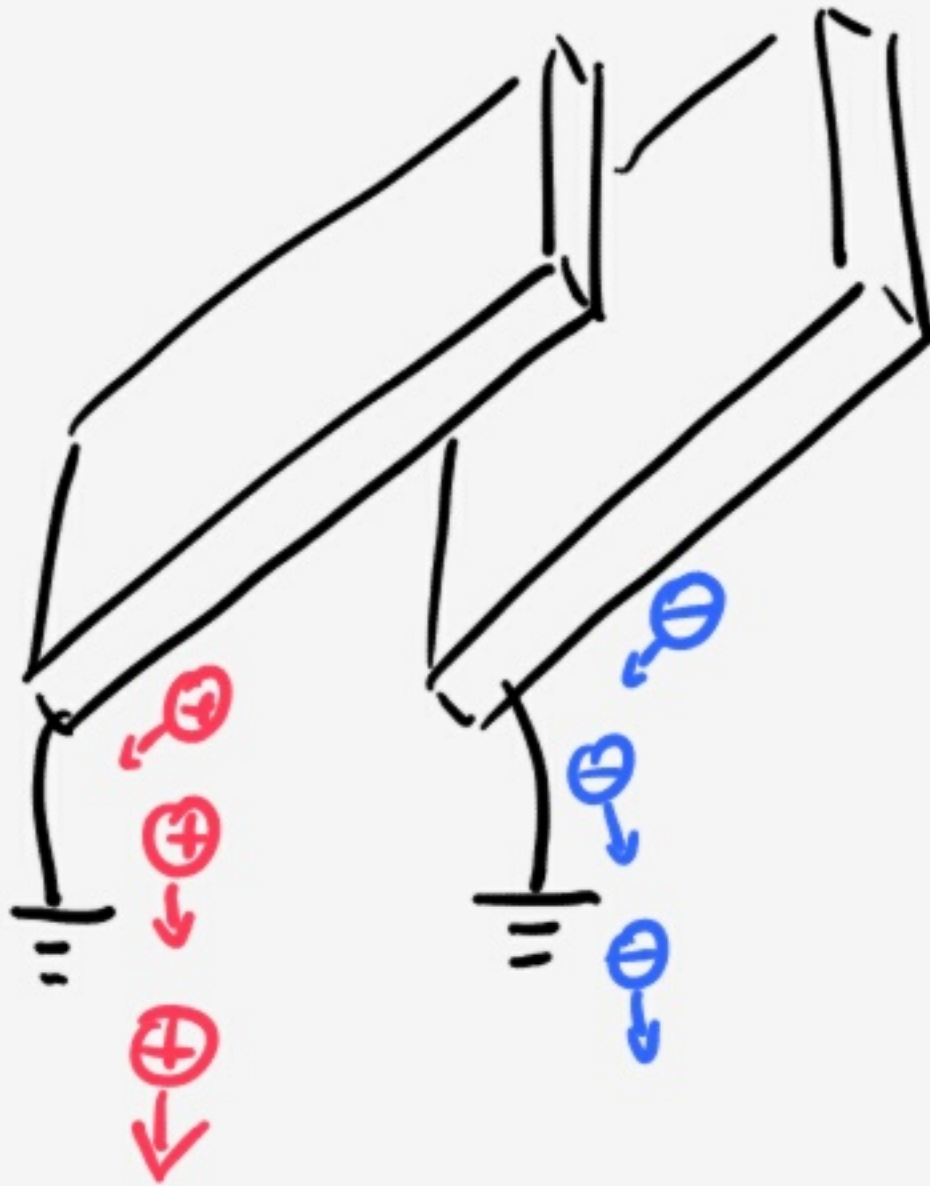


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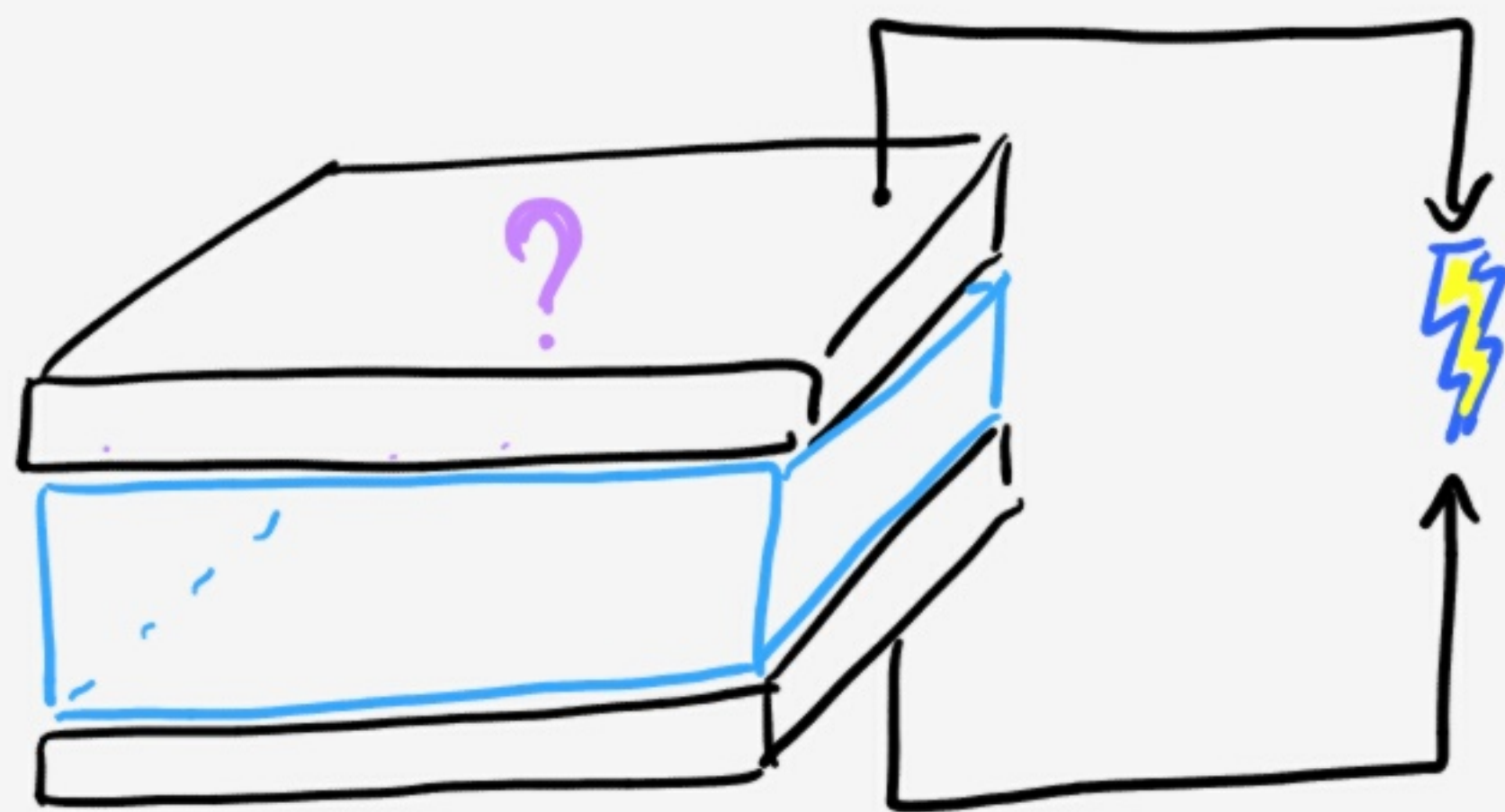




AN ELECTRIC FIELD IS NOW
PRESENT AND A POLARIZATION
FIELD TOO



THE PLATES ARE GROUNDED
AND THEY LOOSE ALL THEIR
CHARGE. THE GLASS IS
UNTOUCHED



!!!

WHY ??

NB: IF A SPARK OCCURS, A DIFFERENCE OF POTENTIAL
HAS TO BE PRESENT

SINCE $\Delta V = \frac{Q}{C}$, A CHARGE HAS TO BE PRESENT...

WHERE DOES THIS CHARGE COME FROM ??