

Copy of a printed diagram referenced as "Conductors and insulators"

Contributors

Fuller, Watson, 1935-

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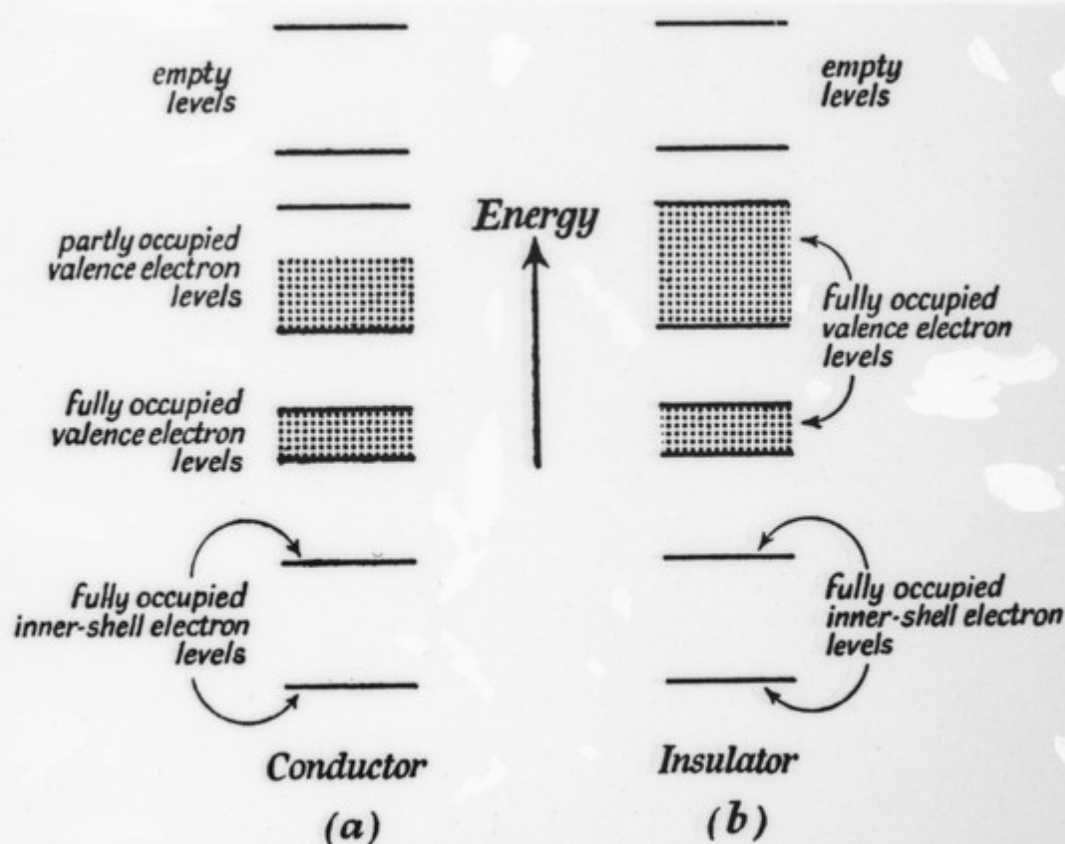
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of the energy levels as occurring in pairs, corresponding to electron waves travelling in opposite directions in the crystal. Suppose that we apply an external electric field by joining the two ends of the metal to the poles of a battery. The immediate effect will be to try to make more electrons flow in the one direction than in the other. This may be achieved in case (a) by giving the



Conductors and insulators. The partly-filled band in (a) makes the substance a conductor, but the filled bands of (b) make it an insulator.

electrons flowing in the direction of the field more energy and thereby raising them into some of the previously empty levels of the band. As a result a current flows, and the substance is a metallic conductor. Indeed the process would continue with an indefinitely great current developing, were it not for collisions of the electrons with the positive nuclei, just as in Drude's early