



ELECTRONIC CAUSE OF POTENTIAL DIFFERENCE IN THE SIMPLE CELL

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If any metal be placed in any ionic solution in which it dissolves, because the negative solution ion already has its valence shell full of electrons, the dissolving metal leaves upon the metal plate its valence electrons so that the dissolved metal becomes a metallic positive ion so it may combine with the solution negative ion to form a molecule. This reaction leaves the metal plate with an ion charge upon it.

When a second metal is placed in the same solution or a solution connected with the first solution by any conducting medium exactly the same kind of reaction takes place as with the first metal, leaving this plate with an electron charge.

The metal plate from which the greater number of equivalent weights dissolves has the greater number of electrons upon it, because each equivalent weight dissolved from either metal leaves one electron upon that metal plate.

Therefore that plate from which the greater number of equivalents have been dissolved has the greater number of electrons upon it and is most negative with respect to the other plate, and causes an electron current in any external circuit available from the more negative to the less negatively charged metal,—or in the terminology of physics, causes an electronic current from the negative to the positive plate of the cell due to the difference of potential of the two plates undergoing chemical action in the cell.

What has been said about the simple cell is equally true of any wet battery or solution cell.

Since writing this paper it has been discovered that Dr. S. R. Brinkley, of Yale University, presented practically the same viewpoint in his *Principles of General Chemistry* published in May, 1933. Since the author announced a paper to be presented in the Oklahoma Academy two years ago and has taught it for many years in his classes, it was thought legitimate to present it as announced.