

Coulomb's Law is Not Violated in Anion Dimers as Reported by Fatila et al –

Dedicated to Charles-Augustin de Coulomb (14 June 1736 – 23 August 1806)

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Abstract

This is a short note to dispel the idea that in some anionic dimers, Coulomb's law is violated. The author points out that the two negatively charged oxygens are connected through a positively charged hydrogen provided by the hydrogen bond.

Short note

This is a short note and concerns the recent Communication entitled “Anions Stabilize Each Other inside Macrocyclic Hosts” by Fatila et al [1]. They describe anion pairs, as if ‘Coulomb's law is violated. The present author points out that the hydrogen bonds which stabilize the anion dimers connect the two negatively charged oxygens by a hydrogen bridge which provides the positively charged hydrogen ion intermediate between the two oxygen anions. This bond, $O^- \cdots (H^+) \cdots O^-$ of length 2.5 Å, also observed in oxalic acid and borohydrates, is described in [2] (see Table 1 therein). So Coulomb's law is not violated.

References

[1] Elisabeth M. Fatila, Eric B. Twum, Arkajyoti Sengupta, Maren Pink, Jonathan A. Karty, Krishnan Raghavachari and Amar H. Flood. *Angewandte Chemie International Edition*, Volume 55, Issue 45, November 2, 2016, Pages: 14057–14062, Version of Record online : 6 OCT 2016, DOI: 10.1002/anie.201608118

[2] Raji Heyrovská, *Chem. Phys. Lett.* 432 (2006) 348 - 351.
<http://dx.doi.org/10.1016/j.cplett.2006.10.037>