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arXiv:1008.4872 (cond-mat)
[Submitted on 28 Aug 2010]

Relativity and the lead-acid battery

[Rajeev Ahuja](#), [Andreas Blomqvist](#), [Peter Larsson](#), [Pekka Pyykkö](#), [Patryk Zaleski-Ejgierd](#)
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The energies of the solid reactants in the lead-acid battery are calculated ab initio using two different basis sets at non-relativistic, scalar relativistic, and fully relativistic levels, and using several exchange-correlation potentials. The average calculated standard voltage is 2.13 V, compared with the experimental value of 2.11 V. All calculations agree in that 1.7-1.8 V of this standard voltage arise from relativistic effects, mainly from PbO2 but also from PbSO4.

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