Capacitance of perovskite solar cells

Do perovskite solar cells have chemical capacitances?
Concluding remarks In summary,contrary to that reported for silicon solar cells capacitances extracted in perovskite solar cells can hardly be interpretedin terms of the established formulation of chemical capacitances. Neither the low- nor high-frequency capacitive responses show the expected exponential trends and values.

How do perovskite-based solar cells respond to depletion layer capacitance?
Capacitance response of perovskite-based solar cells (PSCs) can be exploited to infer underlying physical mechanisms, both in the materials bulk and at outer interfaces. Particularly interesting is applying the depletion layer capacitance theory to PSCs, following common procedures used with inorganic and organic photovoltaic devices.

What is negative capacitance in perovskite solar cells?
Nature Communications 10,Article number: 1574 (2019) Cite this article So-called negative capacitance seems to remain an obscure feature in the analysis of the frequency-dependent impedanceof perovskite solar cells. It belongs to one of the puzzling peculiarities arising from the mixed ionic-electronic conductivity of this class of semiconductor.

Are metal halide perovskite solar cells capacitance-based?
In recent years,capacitance-based techniques have been proliferatedto metal halide perovskite solar cells. Although the fundamental principles of the characterization remain the same,specific challenges have been noted in the interpretation of measurement results.

Can capacitance-based techniques be used to analyze defects in a perovskite layer?
Here,we show that capacitance-based techniques cannot be usedto reliably analyze the properties of defects in the perovskite layer or at its interface,because the high-frequency capacitance signature is due to the response of charge carriers in the hole-transport layer (HTL).

Can perovskites produce next generation solar cells?
I-V and C-V results show very similar behaviour and the principle of PV action is identical. Once the stability issues with perovskites are solved,these devices have very high potentialof producing next generation solar cells reaching at least mid-20% efficiency values.

Perovskite solar cells exhibiting ~ 14-15% efficiency were experimentally measured using current-voltage (I-V) and capacitance-voltage (C-V) techniques in order to extract material and device properties, and ...

Mitigating the migration of mobile ions within perovskite solar cells is a crucial step on the way to improving their stability. In the past, transient capacitance measurements were applied to extract information about

mobile ions, including their activation energy, diffusion coefficient, density, and polarity.

We have unlocked the mechanistic behavior of negative capacitance in perovskite solar cells (PSCs) by analyzing impedance spectra at variable photovoltage and applied bias, temperature-dependent capacitance versus frequency (C-f) spectra, and current-voltage (J-V) characteristics.

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Capacitance-based techniques have been used to measure the electrical properties of halide perovskite solar cells (PSCs) such as defect activation energy and density, carrier concentration, and dielectric constant, which provide key information for evaluating the device performance. Here, we show that capacitance-based techniques ...

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that the capacitance response of the perovskite solar cell is indeed strongly affected by the capacitance of its selective contacts. Popular summary Non-radiative trap-mediated recombination routes are important factors limiting the performance of state-of-the-art perovskite solar cells (PSCs). Identifying the distribution of

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