Intrinsic electric conductivity study of perovskite powders MAPbX$_3$ (X = I, Br, Cl) to investigate its effect on the photovoltaic performance.

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Figures SI1, SI2, SI3, SI4, SI5 and SI6.

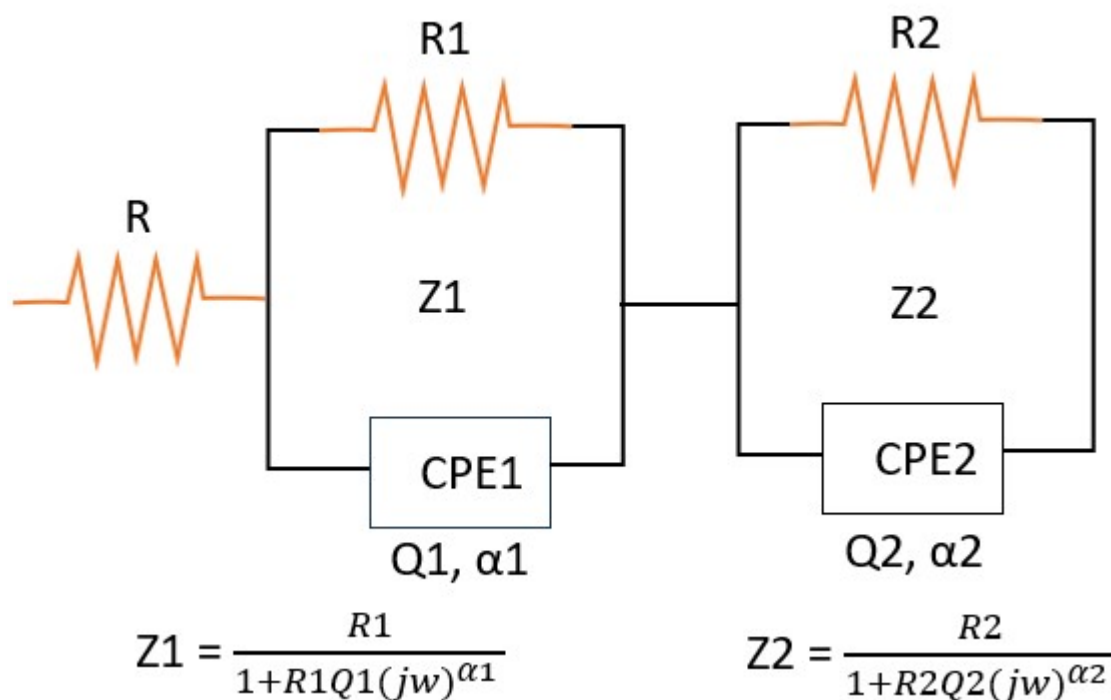$$Z1 = \frac{R1}{1+R1Q1(jw)^{\alpha 1}} \qquad Z2 = \frac{R2}{1+R2Q2(jw)^{\alpha 2}}$$

Figure SI1. The equivalent circuit formed by a parallel combination of two resistance and constant phase element impedance (R1–CPE1) and (R2–CPE2) circuits associated in series.
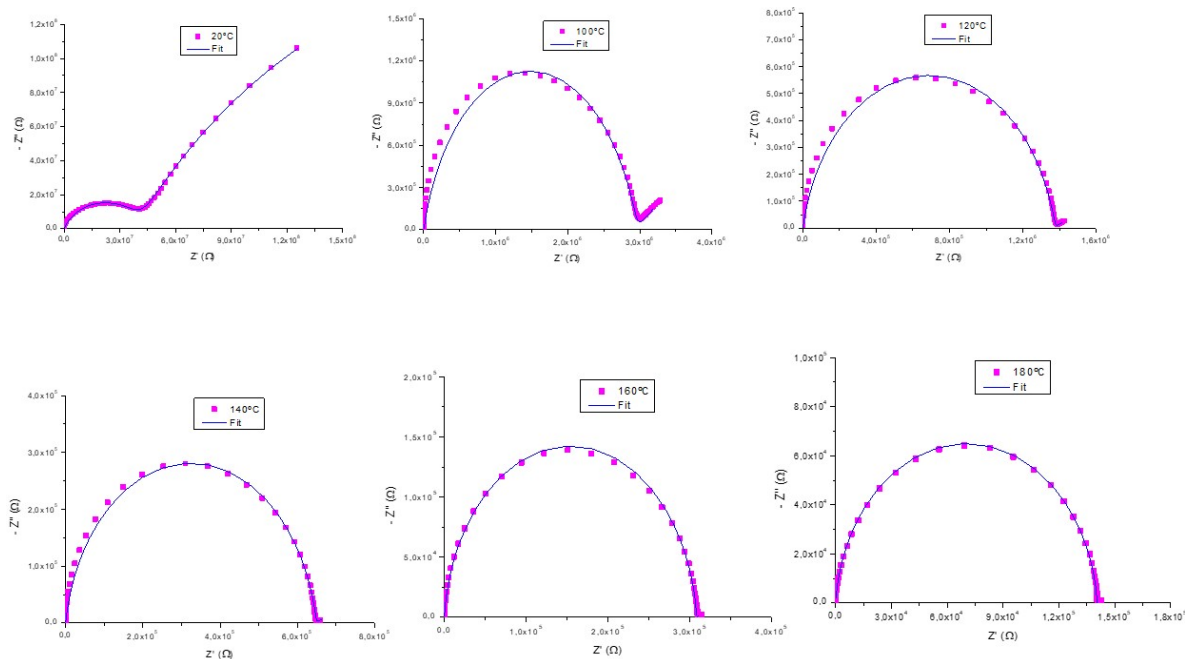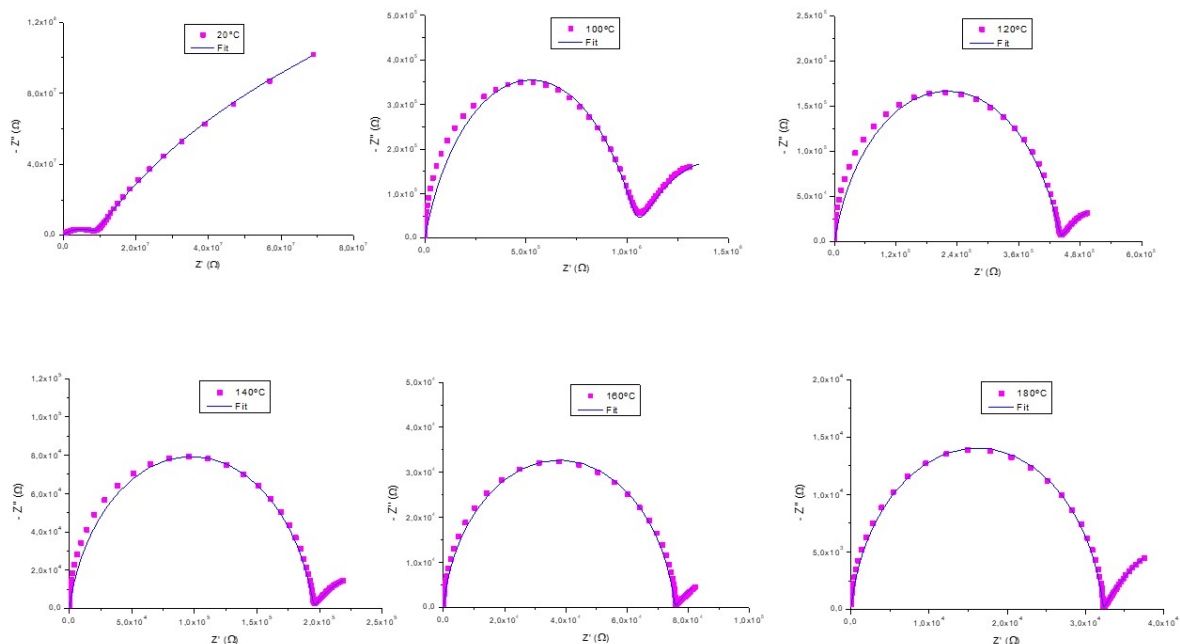
Figure SI2. Nyquist plots representing the complex impedance vs. real part of the impedance, at various temperatures (20ºC, 100ºC, 120ºC, 140ºC, 160ºC and 180ºC) for the MAPbBr$_3$.

Figure SI3. Nyquist plots representing the complex impedance vs. real part of the impedance, at various temperatures (20ºC, 100ºC, 120ºC, 140ºC, 160ºC and 180ºC) for the MAPbCl$_3$.
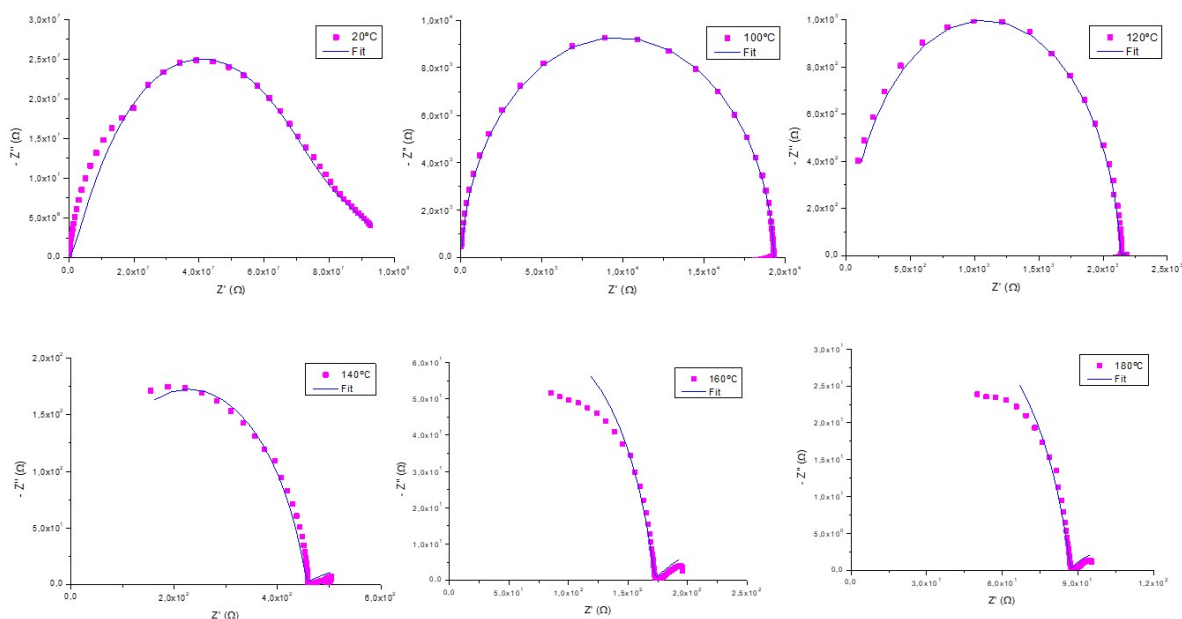
Figure SI4. Nyquist plots representing the complex impedance vs. real part of the impedance, at various temperatures (20°C, 100°C, 120°C, 140°C, 160°C and 180°C) for the MAPbI$_3$.
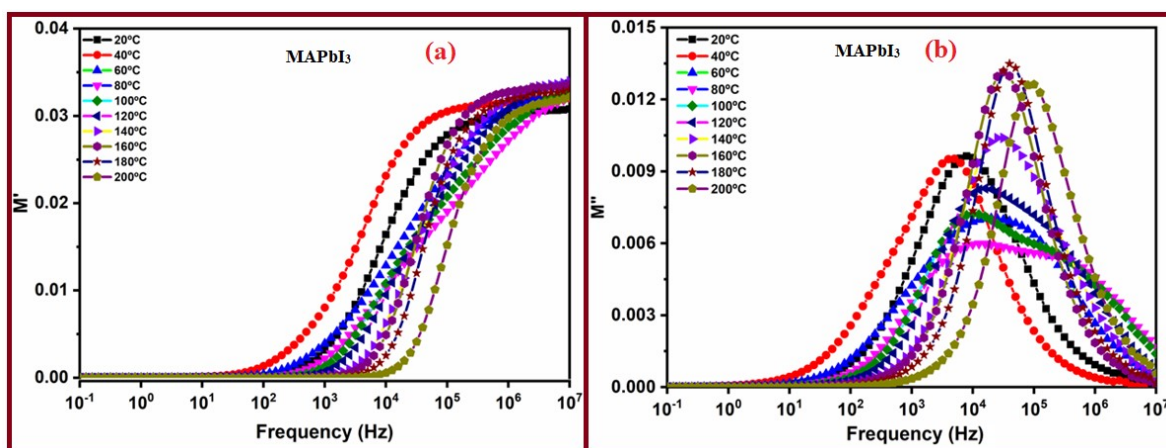

Figure SI5. Real part M' (a) and imaginary part M" of the complex dielectric modulus as a function of the frequency measured at different temperatures for the perovskite MAPbI$_3$.
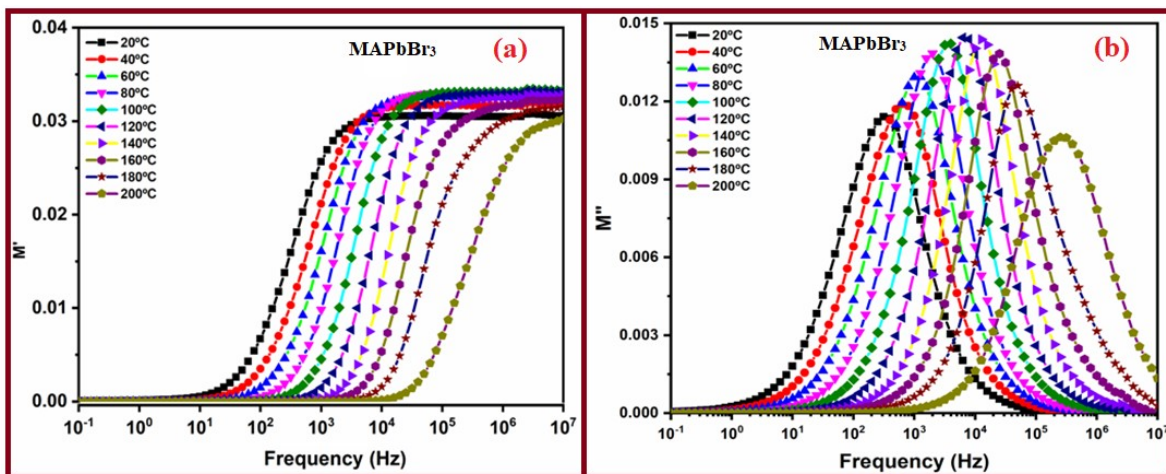
Figure SI6. Real part M' (a) and imaginary part M" of the complex dielectric modulus as a function of the frequency measured at different temperatures for the perovskite MAPbBr$_3$.