

## Electrical/Dielectric Characterization of Organic Light-Emitting Diodes Using Impedance Spectroscopy

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### Abstract

Organic Light-Emitting Diodes (OLEDs) are constructed as a multilayer of small molecules, with the advantages of self-emission, excellent color coordinates, superior power saving, faster response time, etc. The OLEDs exhibit voltage-dependent electroluminescence. The equivalent complex impedance is within the measurement limits in frequency response analyzers. The application of impedance spectroscopy to OLEDs is attempted with the view to understanding the voltage-dependent resistance in OLEDs. The impedance analyses are performed as a function of oscillating amplitudes, bias voltages, thin film thickness, etc. Furthermore, the impedance spectra are modeled using an equivalent circuit whose components are inductors, capacitors, and resistors. The electrical/dielectric responses are proposed to originate from the bulk-based effect, excluding the effect due to interfacial terms between electrodes and small molecules.

**Keyword:** OLEDs, Impedance Spectroscopy, Bulk, Electrical/Dielectric