

PRINTEX® kappa 100 and PRINTEX® kappa 10

Conductive carbon blacks for LFP-based lithium-ion batteries

Technical Information 1488



Orion Engineered Carbons is a global leading supplier of carbon black. Orion offers the broadest portfolio of carbon black products for standard and high-performance applications like rubber, polymers, coatings, printing inks and batteries. With 1,425 employees worldwide, Orion Engineered Carbons runs 14 global production sites and 4 applied technology centers, aiming on quality supply and collaborative partnerships with customers.

Focusing on the current and future energy demands, Orion has developed especially designed carbon black (CB) grades for energy storage applications.

PRINTEX® kappa 100 and **PRINTEX® kappa 10** are conductive carbon blacks for lithium-ion batteries. With properties like high electrical conductivity, high structure and purity, the PRINTEX® kappa products improve the performance of the LFP-cathode in terms of electrode processability, mechanical stability and electrochemical performance.

The good dispersibility of **PRINTEX® kappa 100** and **PRINTEX® kappa 10** during the electrode preparation, allows the formation of a conductive carbon black percolation network on the LFP electrode. The high conductivity of both carbons and the homogeneously distributed percolation network improve the direct current resistance (DCR) at low state of charge (SOC) and exhibit a capacity retention of 78 % at 5C, Figure 1 and 2 respectively.

Table 1

Colloidal properties of PRINTEX® kappa 100 and PRINTEX® kappa 10

Properties	PRINTEX® kappa 100	PRINTEX® kappa 10
BET surface area (m ² /g)	65	74
OAN (ml/100g)	310	145
Sieve residues 45µm (ppm)	5	5
Fe content (ppm)	5	10
Co, Cr, Cu, Ni, Zn content (ppm)	Below detection	Sum 10



Figure 1

DCR vs SOC

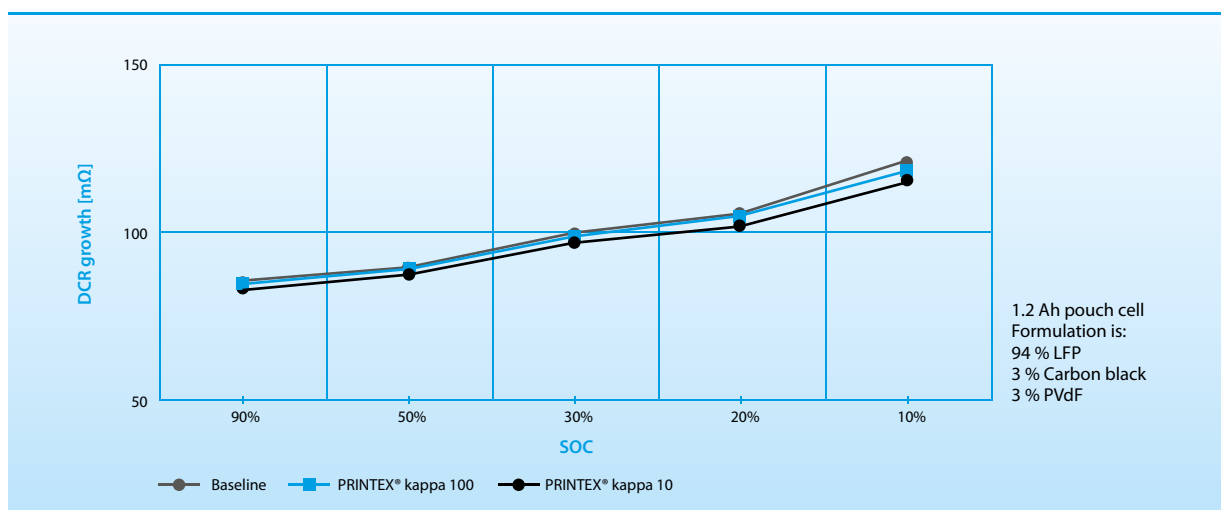
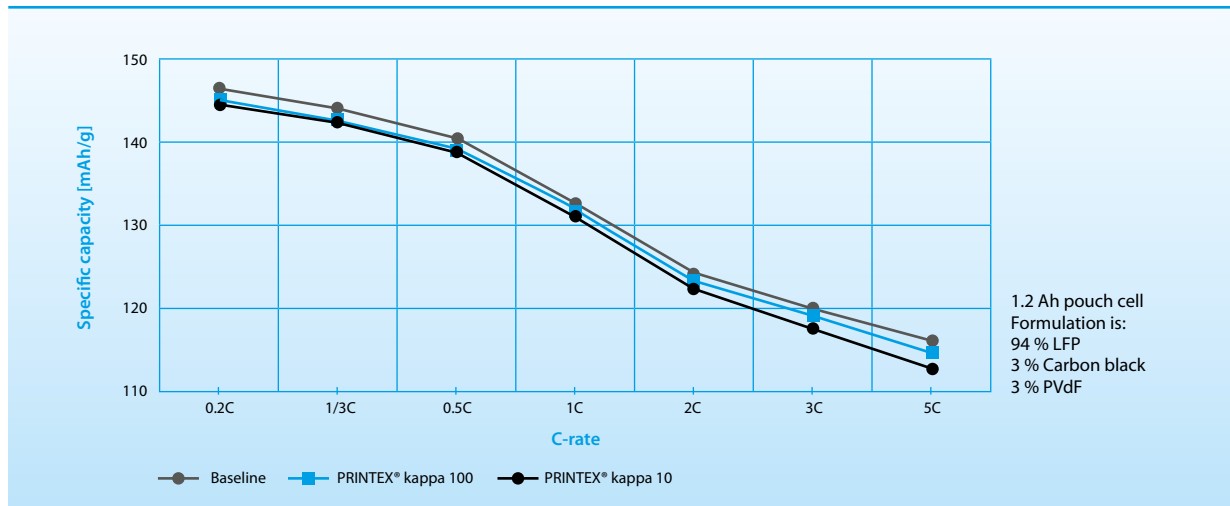


Figure 2

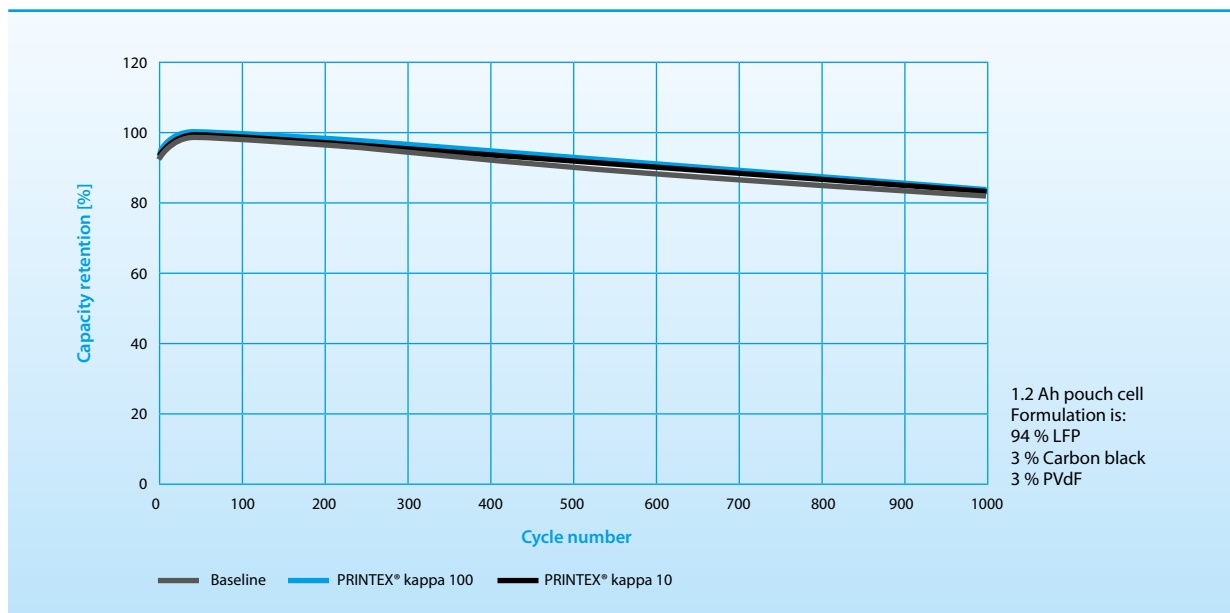
C-rate discharge test



The low metal content and low impurity levels of **PRINTEX® kappa 100** and **PRINTEX® kappa 10** contributes to the long-term cycling of the battery, Figure 3.

Figure 3

Long-term cycling, 1C/1C at 25°C



High-performance conductive carbon blacks play a fundamental role in the development of lithium-ion batteries. By improving the conductivity of the electrodes, the battery enhances its performance in applications like electric vehicles, power tools and energy storage systems. In this context, the wide range of products and the strong know-how of Orion enables current and future lithium-ion batteries.



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