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BERGAKADEMIE FREIBERG

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Separators – Materials Review

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Abstract. Separators are an important component within a Li Ion battery cell. They need to mechanically separate anode and cathode within a cell while at the same time allowing maximum ionic conductivity of the Lithium ion containing electrolyte. Thus, separators have a strong impact on cell production, cell performance, life, and very importantly safety and reliability. Furthermore, separators account for 5 to 15 % of the cell material costs depending on cell design.

Today the separator market volume is about 500 Mio m² caused by consumer applications and is expected to grow strongly over the next decade for mobile and stationary applications using large cells. At present, the market is essentially served by polyolefine membranes, produced in two different production routes. The benefits and potential areas of improvements are being discussed.

Internal short circuits (ISC) across the separator are a major concern in Lithium Ion cells as the initial stages of an ISC are hard to identify. They can damage the cell severely and in worst case cause significant safety problems. Consequently, advanced separators became an intense area of worldwide RD activity in academia and industry due to some limitations of such membranes. New separator technologies are being developed especially to address safety and reliability related properties.

For several decades Freudenberg Nonwovens is an internationally active separator supplier for a range of battery chemistries. Now, a new separator technology has been developed specifically designed for the requirements of the upcoming market of large Li Ion batteries applications.