

BACKGROUND HISTORY

- In 1987 a joint venture between Energy Research Laboratory, Odense, Mead Paper Company, Ohio and Hope Computer, Hadsund was created to develop a lithium (metal) polymer battery. The technology was based on research done at Harwell University, University of Grenoble and Odense University (now SDU)
- In 1989 the partners divided the rights to manufacture the battery among them.
 Energy Research Laboratory got the rights to manufacture in Western Europe,
 Mead in the rest of the "Western world" and Hope Computer in Eastern Europe
 and Africa The three parties can all sell world wide
- Mead sells its rights to the technology to Ultracell later in 1989
- The Energy Research Laboratory change name to Innovision in 1989

BACKGROUND HISTORY

- In 1990 Innocell Aps is created as a joint venture between Innovision in Odense and Ultracell, San Jose, California
- Ultracell acquires Innovision's share of Innocell in 1992. As part of the deal Innovision is no longer permitted to work in the lithium battery field
- Ultracell change name to Valence Technology in 1992
- In 1993 Innocell's activities in Odense are moved to San Jose California together with key employees (6 people)
- Employees at Innovision engaged in electrochemistry research and the employees at Innocell who are not transferred to US looses their job



THE EARLY YEARS - 1994 - 1995

- In I994 Danionics A/S is founded by Steen Yde Andersen (Innovision), Ole Stig Nissen (Innocell) and Christian Rovsing, MEP
- Ole Stig Nissen becomes Managing Director and Steen Yde Andersen R&D manager
- Total of 15 employees from Innovision and Innocell join the company
- Funding for year 1 is provided by the founders and EU through development contracts inherited from Innovision
- The technology Danionics started out developing was lithium ion battery with LMO cathode and coke anode



THE R&D PERIOD - 1995 - 1997

- Additional funding is secured from Dansk Kapitalanlæg and LD in 1995
- In 1996 the company hires Rod Attwooll as new managing director and Ole Stig Nissen assumes the role as business development manager
- Rod Attwooll leaves Danionics in 1997 and is replaced by Niels Kryger Andersen
- The company keeps growing and have around 50 employees by the end of the period
- Ulrik Grape joined the company as sales director in 1996
- Focus is
 - Cell development (chemistry and cell design and assembly)
 - Process development (slurry preparation, coating and cell manufacturing)
 - Electrodes are contract manufactured in UK
- First cell manufacturing line is ordered

1ST. **PRODUCTION LINE**

- Electrode manufacturing is still outsourced, but paste / slurry is made in-house
- Single sided electrodes
- Design capacity of cell line is ~300.000 cells per month
- Dimensions:
 - Min: T x W x L: 2,5 x 32 x 52 mm
 - Max: T x W x L: 14,5 x 105 x 137 mm
- Packaging style: Flow pack (like a candy bar)

THE GROWTH PERIOD – 1998 – 2001

- Steen Yde Andersen leaves the company in 1998 and is replaced by Søren Lemonius
- The company wins it's first order from Compaq in 1999 and start shipping batteries for the iPAQ in 2000
- There are 150 employees when the company goes public in 2001 and raises 540 mio DKK (net 420 mio DKK)
- At the end of 2001 there are 300 employees
- The battery technology is now lithium ion LCO w. MCMB graphite anode common with most other battery companies in Asia
- Two additional product lines are ordered in 2000 and 2001 including an electrode coater
- At its peak in 2001 the production was 300.000 cells per month
- The IT bubble collapse hits Danionics late 2001 and sales crashes

DANIONICS PRODUCTS -EXAMPLES



2ND AND 3RD PRODUCTION LINES

- Electrode coating capability is established
- Double sided electrodes are introduced
- Cell size envelope is the same as line 1
- Design capacity of cell lines are ~300.000 cells per month per line
- Packaging style: Flow pack
- Blister pack packaging style is considered for line 3, but it is decided to stay with the old style



STABILIZATION - 2002 - 2003

- Ole Stig Nissen leaves the company in 2002
- Production line 4 is ordered
- One notable customer is Apple who second source the iPod battery from Danionics, but in limited quantities
- Energy density of the cells are improved by tweaks of the electrodes and improved cell design
- By the end of 2003 the company has less than 200 employees

PRODUCTION CAPABILITY AT THE END OF 2003

- 4 production lines with an annual production capacity of 14 million battery cells
- All production processes from paste mixing to final assembly of battery packs are done internally for improved production flexibility
- Danionics has designed the production lines itself through in depth knowledge about the li-ion polymer technology
- All lines have the flexibility to produce small as well as large footprint cells
- Easy change-over from one size to another

THE END – 2003 – 2004

- Only few new orders are secured, but they do not develop to big volumes due to the market situation
- In 2004 the company is running out of money
- A last attempt to save the company by creating a joint venture in China is done with GP Batteries International as partner
- Danionics and GP creates the joint venture called Danionics Asia in Hong Kong.
 Danionics Asia is owned by Danionics and GP Danionics contributes with technology and equipment and Gold Peak provides the funding for the relocation of production
- Danionics Asia has two daughter companies. Danionics Shenzhen in Shenzhen whereto the production equipment will be relocated from Odense and Danionics International in Odense who will be in charge of Sales, Marketing and R&D
- In January 2005 Danionics International filed for suspension of payments and later same year is declared bankrupt



EPILOGUE - 2005 - 2012

- Danionics A/S still exists as well as Danionics Shenzhen and Danionics Asia, but is planning to liquidate the company during 2013 unless they find a buyer
- As a result of a lengthy court battle between the bankruptcy estate and Danionics Asia / GP, large part of the production equipment perished on the quay of Hong Kong harbor
- There has been cell production at Danionics Shenzhen since 2005, but the production technology was shifted from advanced Japanese and Italian automated equipment to simpler Chinese semi automatic equipment
- The factory in Shenzhen is not an important player in the lithium ion industry in China



WHY DID IT END AS IT DID?

- Danionics was in a way unfortunate that the first orders grew very big very fast. This took the focus away from product and process development and all resources went to meet the customer delivery schedules - At that time product and processes weren't mature and needed refinements to keep Danionics competitive
- Danionics over invested in production equipment because of the high demand but all the added capacity was never needed
 - The Asian JV was established too late. There should probably only have been one line in Denmark, the rest in Asia. This because the customers were in Asia and labor was cheaper

WHY DID IT END AS IT DID?

- The Danionics products were not compatible with competitors products. This was a problem for customers who needed more than one supplier
 - Danionics should have developed product and processes that made their battery compatible with others, but had spent all the money on equipment that was difficult to convert to the new design
- Perhaps Danionics could have survived in Denmark, but the combination of not so good decisions, the market situation in 2002 – 2003 and the competition from Asia turned out to be an overwhelming combination



Thank you!