NiMH batteries & packs
Upgrades boost line’s viability

China suppliers of NiMH batteries and packs continue to underscore product upgrades to meet increasingly “green” requirements. While sustaining a stronghold in portable electronics, they are eying traditional and potential applications originally for NiCd and primary types, including power tools, emergency lighting and hybrid electric vehicles.

Particularly for HEVs, companies are leveraging NiMH technology maturity to compete with lithium, which is still developing. Hybrid vehicles will represent more than 95 percent of about 1.5 million electric transport units worldwide by 2010, based on estimates by China Electronic News. In another decade, HEVs may capture 50 percent of the overall automotive industry. Similarly, primary batteries present a huge opportunity, currently comprising a $14 billion market globally.

Regardless of application, increasing the battery’s capacity tops the overall R&D agenda of China companies. This year’s AA releases will have 2,500 to 2,700mAh nominal capacity, improving most available models’ current 1,800 to 2,000mAh level. In AAA versions, the target is 900 to 1,000mAh. These specifications are expected to match the power needs of various devices, including digital video and still cameras, portable A/V players, calculators, e-book readers, wireless computer mice and remote-controlled toys.

For electric tools and emergency lights, makers are trying to realize a high operating temperature of 55 to 70 C.

Lowering the self-discharge rate is another development objective for the line. Suppliers are accelerating efforts in this area to capture primary battery applications, with most planning to launch new models this year. Unitech Battery Ltd and Shenzhen FBK Electronic Co. Ltd have released products that can retain more than 80 percent of power after a year in storage. Both makers’ ongoing and future R&D initiatives target further improvements in this aspect.

To achieve these goals, hydrogen

Taiwan
Niche applications sustain line
Taiwan suppliers are keeping NiMH batteries and packs in their selections even if most have migrated to lithium production because of better returns. The former chemistry has found a niche in applications requiring increased safety such as power tools, industrial instruments and medical equipment. A mature technology, NiMH is more reliable on this score than lithium.

Major player Nexcell Battery Co. Ltd, for instance, is developing high-capacity NiMH modules for special uses. It will introduce battery packs that can provide 40 and 100Ah capacity. Power storage for solar and wind energy systems is next on the company’s R&D agenda. Nexcell’s NiMH range includes standard-size low self-discharge batteries and customized packs.

At present, rechargeable AA and AAA models lead mainstream supply in Taiwan. Units with low self-discharge rates, marketed as ready-to-use batteries, comprise a key trend. These promise a life span twice longer than traditional variants. Such versions resolve capacity decay problems, retaining 70 to 80 percent of capacity even after six to 12 months.

As price competition is tight in this category, makers expand portfolios and offer related products such as battery chargers to boost sales. Others, including Hotgiant Co. Ltd, act as agents, subcontracting manufacturing to mainland China partners to cut costs.

The island has more than 500 suppliers of batteries and packs, with the majority operating factories in the mainland. Fewer than 10 pursue NiMH battery packs, mostly for OEM and ODM business.
storage alloys with low cost but high performance and stability are being developed. Academic and research institutions are currently at the forefront of these efforts, with some battery manufacturers taking an active collaborative part. A number of large operations have set up R&D centers for the purpose. Unitech plans to build one with another local company.

At present, makers use mainly AB5 rare earth-based materials. Although these have an improved recycle life, such inputs support reduced electromechanical capacity at 300 to 330mAh/g and a high discharge rate at low temperatures.

In contrast, multiphase metals will enable a capacity of more than 360mAh/g and cycle life exceeding 300 times. Recently introduced in the market, these have LaNi5 or La,LnNi as second phase besides CaCu5 in the original AB5 versions. Adoption in China is forecast to start this year.

The country’s production of NiMH batteries and packs is expected to continue growing at an annual rate surpassing 15 percent. The line in fact coasted over the economic crunch with an almost 8 percent increase in terms of output. The volume reached 1.4 billion units from 1.3 billion in 2008, according to the China Industry Association of Power Sources.

Export sales dropped, however, as overseas orders declined. Most makers reported a more than 10 percent dip in total revenue, with foreign trade lower by over 20 percent. Nevertheless, they were able to recoup this in the second half as buyer inquiries started picking up.

Unitech, for example, is even looking to expand production by 50 percent, having acquired new domestic and overseas customers with its recent releases. The company is shifting emphasis from Europe to North America and Southeast Asia this year. It also makes Li-ion batteries.

For Shenzhen FBK, the increase in output will exceed 20 percent in 1H10 to accommodate climbing orders. The capacity will rise accordingly to 3.6 million units from 3 million as early as the first quarter. More than 60 percent of the supplier’s yield is exported worldwide.

Products & prices
China’s current NiMH selection comes in A, AA, AAA, SC, C, D and F sizes. The mainstream types are still AA and AAA used in portable electronics. These have a rated capacity of 1,800 to 2,600mAh and 600 to 1,000mAh.

The battery packs offered are mainly for power tools, and electric bikes and vehicles. Most products meet CE, UL and RoHS requirements and other relevant standards.

The majority of suppliers offer OEM and ODM services, which account for more than half of business. Many carry other chemistries in their lineups, including NiCd and lithium. At Shenzhen FBK, the last type represents over half of output, comprising AAA and AA sizes with respective capacity of 900 and 2,400mAh.

NiMH accounts for 20 to 80 percent of companies’ total yield.

Makers turn mainly to domestic sources for raw materials but use some imported components. Separators, for example, come from Japan.

The cost of inputs has been fluctuating, resulting in higher prices even during the economic downturn. Cel Battery Co. Ltd raised quotes by about 20 percent due to elevated nickel outlay, which increased by more than 20 percent during the period.

**Price guide: AA NiMH batteries**

<table>
<thead>
<tr>
<th>Price range (per unit)</th>
<th>Basic features</th>
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<tbody>
<tr>
<td>$0.30 to $0.50</td>
<td>1,800 to 2,000mAh capacity; 1.2V voltage; 1,000 cycles</td>
</tr>
<tr>
<td>$0.51 to $0.65</td>
<td>2,000 to 2,400mAh capacity; 1.2V voltage; 1,000 cycles</td>
</tr>
<tr>
<td>Above $0.66</td>
<td>2,400 to 2,700mAh capacity; 1.2V voltage; 1,000 cycles</td>
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**Product gallery**

**Shenzhen FBK Electronic Co. Ltd**
(mainland China)

Model: FBH-50A2700-1
MOQ: 2,000 units
Delivery: 15 days
Description: 2,700mAh capacity; 1.2V nominal voltage; for cordless phones, digital cameras, MP3 players, razors, flashlights, LED lights, walkie-talkies, electronic toys, tools, sweepers, medical instruments, meters

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**Shenzhen FBK Electronic Co. Ltd**
(mainland China)

Model: FBH-4500-1
MOQ: 1,000 units
Delivery: 15 days
Description: 4,500mAh nominal capacity; 1.2V nominal voltage; for cordless phones, digital cameras, MP3 players, razors, flashlights, LED lights, walkie-talkies, toys, tools, sweepers, medical instruments

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**Strongwill Ultra-Power Battery Technology**
(Hong Kong)

Model: H2500AA
MOQ: 1,000 units
Delivery: 21 days
Description: Rechargeable; AA; 2,500mAh nominal, 2,350mAh minimum capacity; 1.2V nominal voltage; 31.5g
In 1H10, quotes are expected to keep steady, thanks to a similar trend in material overhead.

**NiMH vs. lithium**
Although lithium has eaten into NiMH’s portable electronics domain, it will be a minority in the global HEV segment until 2020, according to IT consulting firm Nomura Research Institute. By then, NiMH’s share in the overall vehicle market will be 60 percent but is expected to dive soon after. So far, many major car manufacturers have started diverting R&D efforts toward lithium-based models. These include Toyota, Nissan and GM. The last has announced this year’s release of its first such hybrid unit.

In the domestic sector at least, most makers are certain of NiMH’s strong showing for five more years, thanks to support from the central government. The Adjustment and Development Plan in Automobile Industry policy announced in 2009 targets 500,000 HEVs by 2011, equivalent to 5 percent of total vehicle output initially. The Ministry of Industry and Information Technology in turn issued a supplementary measure called Access Regulations for New Energy Vehicle Manufacturers and Products. It classifies NiMH-powered HEVs as mature, mandating the battery technology’s eminence in China’s nascent energy automotive segment.

Unitech said NiMH and lithium will continue to drive the company’s battery yield and R&D in several more years. It counts NiMH’s simple control circuit and high safety as advantages over lithium in HEV applications.

In the mobile phone battery sector, however, NiMH’s share is steadily diminishing. Currently at 10 percent, it may decline further within the next two years.

**Industry snapshot**
Hundreds of manufacturers make up mainland China’s NiMH industry. More than 70 percent of them are local ventures, and the rest with investment from Japan, the US, Taiwan and Hong Kong. Thanks to upbeat forecasts for the line, new entrants are expected in the next three to five years.

Twenty to 30 are large enterprises with an annual capacity running up to 100 million units. Foreign-invested ones can produce from 60 million a year. More than 60 percent of output is exported.

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**Hong Kong**

**Various sizes, custom configurations**
NiMH batteries from Hong Kong come in D, C, AA, AAA and 9V sizes, and customized packs. These comply with strict environmental regulations for entry into major markets such as North America and the EU. Makers also offer models for price-conscious buyers and emerging markets.

Extending the shelf life and charging cycle, and raising the storage capacity remain R&D thrusts.

ATC Batteries Industry Co. Ltd offers AA, AAA, C, D and 9V NiMH batteries. Its eneMega rechargeable series features low self-discharge and lasts up to 1,000 recharge cycles. The environment-friendly models are precharged and ready to use upon purchase.

Strongwill Ultra-Power Battery Technology supplies button cell, cylindrical, prismatic and 9V NiMH batteries and packs. The last can be tailor-made using AA or AAA batteries with a universal plug attached. Aside from working with OEM customers, the company markets unbranded units and retail-packed NiMH versions carrying the in-house Xtra-Power brand.

Hong Kong has a steadily growing supplier base for the line. This currently consists of at least 20 enterprises, most of which also offer battery chargers. Products are usually bundled as sets.

Many makers are specialists in other battery types such as primary, lead-acid, lithium and alkaline. These have cooperative ventures with mainland China factories that have the facilities for NiMH manufacture. Others from the accessories and power supply sectors provide NiMH batteries under their brands through mainland subcontractors.

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**Product gallery**

**Unitech Battery Ltd (mainland China)**
Model: Ni-Mhsc3900mAh12v
MOQ: 1,000 units
Delivery: 25 days
Description: 3,900mAh rated capacity; 12V rated voltage

**Unitech Battery Ltd (mainland China)**
Model: Ni-MHAA2700mAh1.2v
MOQ: 2,000 units
Delivery: 5 days
Description: AA; 2,700mAh rated capacity; 1.2V rated voltage; 1,000 cycles

**Unitech Battery Ltd (mainland China)**
Model: Ni-Mhsc3600mAh7.2v
MOQ: 1,000 units
Delivery: 25 days
Description: High rate discharge; for power tools, remote-controlled toys
## CONTACT DETAILS

### NiMH batteries & packs

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