Lithium Ion Batteries on the Upswing

The trend in shipment of secondary batteries within Japan has changed recently. As shown in Fig. 1, the number of Li-ion batteries shipped in Japan since the end of 1996 has grown to such an extent that it has exceeded the demand. From the beginning of 1997, this trend has been and still continues to intensify. The excess supply has brought the cost down by an average of 20% in 1998. The main applications of Li-ion batteries are for laptop computers and cellular phones. Applications anticipated in the fields of automobiles (e.g., energy sources for hybrid cars or electric vehicles) and large energy storage devices have not become substantial yet. Table 1 lists recent developments in Li-ion polymer batteries. Many Japanese battery companies have announced the shipment of Li-ion polymer batteries. Matsushita Battery Industry Co. has just begun marketing Li-ion polymer batteries, and Sony Energy Tech. Co. announced it would market its products in August 1999. As shown in Table 1, the energy density of the Li-ion polymer battery is not much higher than that of conventional lithium batteries.

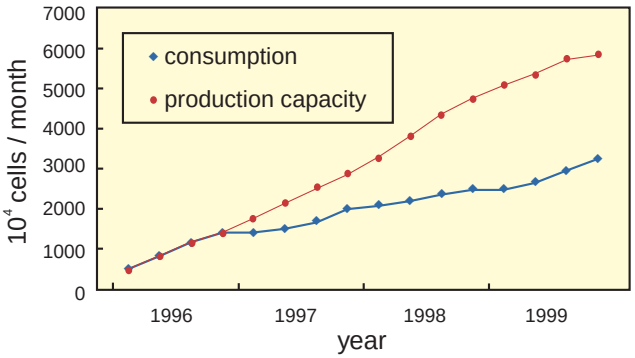

FIG. 1. The number of Li-ion batteries shipped in Japan, 1996-1999.

FIG. 2. Li-ion polymer battery. (Photo courtesy of Panasonic.)

Why then the excitement in Li-ion polymer batteries? It is mainly the reduced thickness and weight reduction of the cell. The recent development of energy-saving systems for cellular phones has brought down the energy density requirement. In addition, the demand for decreasing the cell thickness has become greater than ever. Furthermore, the battery companies believe that the Li-ion polymer battery will make it possible to deliver the advantages of the new technology to consumers. However, more time will be needed before the new battery gains a substantial share in the lithium battery market. The new battery is not expected to be an immediate success in replacing the traditional lithium battery; however, because of the advantage in safety, the Li-ion polymer battery will become a key energy source product for the next generation. ■

JapanWatch was compiled by Tetsuya Osaka. Further information on its contents can be obtained from osakatet@mn.waseda.ac.jp. and also from www.mbi.panasonic.co.jp.

TABLE I.

	Cathode	Electrolyte	Anode	Voltage	Size mm	Capacity mAh	Energy Wh/L	Density Wh/kg	Application	Production Start
Matsushita Battery	$LiCoO_2$	PVDF gel	Graphite	3.7	35x62x3.6	500	250	125	Cellular	January 1999
Sony	$LiCoO_2$	PVDF gel	Graphite	3.7	35x62x3.8	540	245	125	Cellular, PC	Spring 1999
Japan Storage Battery	$LiCoO_2$	PVDF gel	Graphite	3.6	32x82x3.4	510	210	125	Cellular, MiniDisc	Summer 1999
Hitachi Maxell	$LiCoO_2$	PEO gel	Graphite	3.6	54x86x3.0	500	130	90	Cellular, PC	April 1999
Sanyo	$LiCoO_2$	PEO gel ?	Graphite	3.6	37x75x3.5	550	200	120	Cellular	Summer 1999
Toshiba Battery	$LiCoO_2$	PVDF gel	Graphite	3.6	36x74x3.6	650	245	115	Cellular, PC	Fall 1999
Yuasa Corp.	$LiCoO_2$	PEO gel	Coke	3.6	54x74x2.2	400	165	95	Cellular, MiniDisc	Fall 1999 August 1998, primary
Hirion/Mitsubishi Chem.	$LiCoO_2$	PEO gel	Graphite	3.7	34x48x4	500	280	130	Cellular, PC	Spring 1999
Ultralife (US)	$LiMn_2O_4$	PVDF gel	Graphite	3.7	51x103x6.5	1700	185	105	Cellular, PC	3Q 1997
Valence (US)	$LiMn_2O_4$	PVDF gel	Graphite	3.7	36x65x9.0 102x127x5	1200 3900	220	110	PC	3Q 1998
Thomas & Betts (HET) (US)	$LiCoO_2$	PVDF gel	Graphite	3.7	30x48x6.5	530	220	120	Cellular	4Q 1998
Lithium Tech. (US)	$LiCoO_2$	PVDF gel	Graphite	3.6	203x305x6.4	2400?	240	125	PC	4Q 1999
Shubila (Malaysia)	$LiCoO_2$	PVDF gel	Graphite	3.65	58x30x4.4	450	215	120	Cellular	Fall 1998
Electrofuel (CA)	$LiCoO_2$	PVDF gel	Graphite	3.6	108x138x6	10800	435	175	PC	2Q 1999
(Moltech (US)	Org. sulfur polymer	Org. solvent	Li metal	2.1	34x48x5.0	800	210	170	Cellular	3Q 1999