

LONGEVITY CHALLENGE

Adding life to batteries

Handset makers look at new materials, designs for long-lasting varieties

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SMARTPHONE TECHNOLOGY HAS experienced significant advancements over the past few years. Handsets now feature advanced cameras, faster processors, and sophisticated displays. These developments have been rapid and impressive. However, battery remains an area where the progress has been slower, leaving users reliant on frequent charging.

Smartphones still use lithium-ion batteries, which mostly have stayed the same for decades. Industry stakeholders emphasise that lithium-ion batteries need advancements to meet the demands of the future. They also need to charge faster so that devices can be used sooner and there is less downtime. Additionally, batteries need to be more sustainable so that they can be recycled and their disposal doesn't harm the environment.

In recent years, smartphone manufacturers have concentrated on improving visible features that appeal to consumers, particularly cameras. Even the displays have undergone significant improvements. Processors have also

ANKU JAIN,
MD, MEDIATEK INDIA

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improved. Companies like Qualcomm and MediaTek have developed smaller, faster, and more efficient chips. These processors power a range of functions, from gaming to AI, making smartphones quicker and more capable.

Anku Jain, MD of MediaTek India said, "We develop state-of-the-art system on a chip (SoC) that can meet the high demands of today's consumers. Our latest chip, MediaTek Dimensity 9400, is designed to improve battery efficiency by up to 35%."



ARUN MISRA,
CEO, HINDUSTAN ZINC

ZINC-BASED BATTERIES ARE EMERGING AS AN AFFORDABLE ALTERNATIVE TO LITHIUM-ION VARIETIES



The primary issue with lithium-ion batteries is their energy density. They can only store a limited amount of energy, and efforts to increase their capacity have not yielded the desired results. One major challenge is their physical limitation. Batteries store and release energy through chemical reactions, but attempts to increase energy density can lead to overheating, reduced lifespan, or dangerous malfunctions. Therefore, manufacturers prioritise safety and reliability over radical innovations in bat-

tery technology.

Arun Misra, CEO, Hindustan Zinc, highlighted that the market today, is dominated by less stable lithium-based batteries, emphasising the need for safer, more abundant alternatives like zinc-based batteries. According to him, zinc is a critical metal across numerous industries and plays a crucial role in the global energy transition. "Lithium is a rare element with significant supply chain issues," he added.

Consumer expectations also contribute to the slow pace of bat-

tery development. Most smartphone users are used to charging their devices daily, so manufacturers focus on optimising power consumption instead of increasing battery capacity. Faisal Kawoosa, chief analyst at TechArc, pointed out that while significant breakthroughs in battery capacity have not been achieved, modern smartphones last longer and charge faster than they did five years ago.

Although lithium-ion batteries remain the standard, researchers are exploring alternative materials and designs to address their limitations. Solid-state batteries are one promising development. These batteries replace the liquid electrolyte found in lithium-ion batteries with a solid material, potentially increasing energy density and improving safety. Companies like Samsung are investing in this research, and commercial applications could be introduced in the coming years.

Another area of research focuses on silicon-carbon anodes. Silicon can store more lithium than the graphite used in traditional batteries, which could lead to higher capacity and shorter charging times. However, silicon expands and contracts during charging cycles, posing challenges to long-term stability. Researchers are working on solutions to these problems to make silicon-carbon batteries viable.

In the short term, faster-charging technology continues to be the most notable advancement in battery-related innovation. Companies like Xiaomi and Oppo have introduced charging systems that can fully charge a smartphone in minutes, offering a temporary solution to the battery dilemma.