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NMB Unveils High-Performance 300Wh/kg Sodium-Ion Battery Prototype

Kuala Lumpur, 2 March 2026 – NanoMalaysia Berhad (NMB) has achieved a major milestone in Malaysia's energy storage ambitions with the development of a Graphene-Enhanced Sodium-Ion Battery prototype delivering energy density exceeding 300Wh/kg, which is amongst the best in the world.

Developed under the NanoMalaysia Energy Storage Technology Initiative (NESTI), the sodium-ion battery utilises a NASICON-based sodium vanadium phosphate (NVP) cathode integrated with graphene nano-additives to enhance electrochemical performance, energy density, and structural stability for next-generation energy storage. Unlike conventional lithium-ion batteries, sodium-ion technology leverages abundant and cost-efficient raw materials, namely sodium or natrium, reducing dependence on critical minerals such as lithium, nickel and cobalt. It also offers improved safety and thermal stability, key considerations for large-scale energy storage and mobility applications. This is in line with the emerging technological shift and market trend towards sodium-based battery chemistry, as demonstrated by CATL (China), Faradion (UK), Natron Energy (US) and Tiamat (France).

Developed by NMB's projects team in collaboration with International Battery Centre (IBC) Sdn. Bhd., the technology has reached the prototype validation stage, marking a key step towards further development and commercial readiness. This achievement places Malaysia in the global battery map, thus aligning with the 'Made In and By Malaysia' model for high technology products

NMB's Chief Executive Officer, Dr Rezal Khairi Ahmad, said: "By surpassing 300Wh/kg at the prototype stage, we demonstrate that sodium-ion technology can deliver strong performance comparable to that of lithium-ion while addressing cost, safety, and material sustainability challenges. Through NESTI, we are advancing Malaysia's energy storage ecosystem, driving technology development, scale-up, and commercialisation to strengthen our position in the regional battery value chain. The said technology represents an important shift away from lithium dependence and positions Malaysia as one of the leading technology giants in the battery market. Multiple partnerships with industrial off-takers are crucial in the next steps in climbing up the technology readiness level to ensure the interests of local and international private investors are secured"

The global sodium-ion battery market is projected to grow from USD 1.8 billion in 2025 to USD 12.5 billion by 2035, a nearly seven-fold expansion at a CAGR of approximately 21.4%. NASICON-type systems such as NVP/graphene batteries are gaining traction globally due to their structural robustness and suitability for high-cycle applications, positioning sodium-ion as a complementary alternative to lithium-based systems.

The sodium-ion prototype is strategically positioned for large-scale energy storage and mobility applications, primarily targeting grid-scale and utility energy storage, solar and wind load shifting, telecommunications backup systems, and low-speed electric mobility, including two-wheelers, three-wheelers, and short-range electric vehicles.

As Malaysia's leading nanotechnology commercialisation agency under the Ministry of Science, Technology and Innovation (MOSTI), NMB continues to advance local capabilities across lithium-ion, sodium-ion, next-generation batteries, and energy storage systems, enabling industry partnerships, pilot manufacturing, and standards development to strengthen Malaysia's role in the regional battery ecosystem.

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