An environment-friendly rechargeable battery

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A high performance rechargeable NiZn battery offers a viable alternative to hazardous NiCd cells

While researching a new rechargeable battery for electric scooters, French and Spanish partners in EUREKA project NITIN SCOOTER made the breakthrough that will finally make nickel zinc (NiZn) batteries economically viable. Such batteries have always offered the potential to be a long-term replacement for nickel cadmium (NiCd) cells as they fulfil the power requirements and offer environmental benefits. However, the instability of the zinc electrode restricted them to just 20 recharging cycles. The partners in this EUREKA project have overcome this problem and can now produce a safe alternative to NiCd that can be used for over 1000 charging cycles.

"Many devices are powered by nickel cadmium cells. While efficient, they contain the dangerous heavy metal cadmium that could in the future face restrictions - even a ban," explains Robert Rouget, project manager at French lead partner S.C.P.S. The NiZn battery system offers many potential advantages - combining high energy with low cost - but the poor cycle life was the main obstacle to commercialisation.

"Our aim was to significantly increase the cycle life of the battery while keeping a simple design, in order to keep costs low and deliver a rechargeable battery capable of meeting the triple demands of low cost, safety and durability," explains Rouget. "Our new NiZn cells eliminate the need for environmentally damaging cadmium and are based on an

aqueous electrolyte that eliminates the risk of fire."

Stabilising the electrode

NITIN SCOOTER made use of a copper foam developed by S.C.P.S. in EUREKA project E! 2179 3D STRUCTURES. By adding fine particles of a new conductive ceramic from Spanish partner, SHS Ceramicas, the consortium succeeded in stabilising the electrode, preventing the damaging formation of zinc compounds that caused loss of conductivity and short circuits.

"Tests conducted in-house and by independent testing centres, including the R&D Centre of Electricite de France, demonstrate that our NiZn batteries meet commercial requirements in terms of high cycle life, high specific energy and power, and low cost," says Rouget.

The resultant battery is environmentally friendly, inexpensive and performs well, providing energy for large and small applications requiring a rechargeable battery. The project partners have now created successful prototypes and are looking for additional partners to take advantage of the potentially huge market for the new batteries, either as the power supply for a scooter or as a more general replacement for hazardous NiCd cells.

"EUREKA is a very efficient and easy means to create productive partnerships to produce commercial results. Our collaboration with SHS Ceramicas provided the conductive ceramics that helped make our zinc electrode technology economically viable," says Rouget.

Source: EUREKA