

Picosun's high aspect ratio ALD enables 3D thin-film batteries

ESPOO, Finland, 25th March 2019 – Picosun Group, a leading supplier of advanced ALD (Atomic Layer Deposition) thin film coating technology for industrial production, reports excellent results in conformal ALD coatings for solid-state 3D thin-film batteries.

Solid-state thin-film batteries are increasingly needed in portable and wearable electronics such as smartphones, tablets, smart watches, autonomous sensors, and also in implantable medical devices. These batteries have to combine small, compact size with high energy density, which is why the next step is to move away from planar battery geometry to three-dimensional one. In 3D thin-film batteries, nanostructured, corrugated high aspect ratio (HAR) structures multiply the active surface area and thus the battery's charge storage capacity.

Advanced manufacturing methods are called for to produce the functional layers such as electrodes and solid electrolyte inside these structures. ALD is able to create the highest quality conformal material layers inside HARs even as high as 1:3000, so it shows great potential for 3D thin-film battery manufacturing. Picosun's high aspect ratio ALD is already utilized in various semiconductor and MEMS applications on industrial scale, and now it has been successfully used in manufacturing solid-state 3D thin-film battery electrodes. Excellent results have been achieved already with the standard PICOSUN™ ALD reactor configuration with optimized process parameters, but for even more challenging HAR coating needs, Picosun's patented Picoflow™ diffusion enhancing technology is ideal.

"The skyrocketing popularity of portable and wearable electronics creates a demand for compact and embeddable energy sources to power these devices. Solid-state 3D thin-film batteries are a strong candidate for this, and we at Picosun are happy to introduce our ALD solutions to the manufacturers. It is notable that even with our basic ALD we are able to create the functional layers with the highest conformality inside the batteries' challenging HAR structures, and our approach is readily scalable to high volume industrial production. And, when these structures get even more complicated on nano-scale, our Picoflow™ technology is there to guarantee top quality deposition results with industry-proven reliability," summarizes Mr. Juhana Kostamo, Managing Director of Picosun Group.

Picosun provides the most advanced ALD thin film coating technology to enable the industrial leap into the future, with turn-key production solutions and unmatched expertise in the field. Today, PICOSUN™ ALD equipment are in daily manufacturing use in numerous major industries around the world. Picosun is based in Finland, with subsidiaries in Europe, North America, Singapore, Taiwan, China, and Japan, and a world-wide sales and support network. Visit www.picosun.com.

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