

Picosun-SINANO collaboration yields excellent TiN process

ESPOO, Finland, and SUZHOU, China, 26th September 2018 – Picosun Group, a leading, global provider of ALD (Atomic Layer Deposition) thin film coating solutions, and Suzhou Institute of Nano-Tech and Nano-Bionics (SINANO) report excellent quality titanium nitride (TiN) deposited with Picosun's plasma-ALD technology.

In microelectronic component manufacturing, the ohmic contact between metallic and semiconducting material layers is critical regarding the component functionality and lifetime. Typically, pure metals such as titanium have been employed as the metallic material, but they have certain drawbacks which is why titanium nitride has been proposed as the substitute. TiN is metallic as well, and its conductivity and thermal stability are better than those of pure titanium metal, but to obtain high quality TiN films, the manufacturing method and conditions are critical.

This is where Picosun's remote plasma ALD (RPEALD) technology shows its strength. In Picosun's approach, the plasma source is located on a high enough distance from the substrate, so that instead of aggressive ion bombardment, highly reactive radicals react at the substrate surface. This allows low process temperatures without thermal stress or physical ion damage to the substrate and enables deposition of also conductive materials without the risk of short-circuiting, or gas back-diffusion into the plasma source. The right selection of precursor chemicals and plasma gases guarantees high purity TiN films with very low oxygen content and work function, low sheet resistivity, exact stoichiometry, and high uniformity (*). Furthermore, the process window is wide regarding the process parameters and temperature, enabling the process to be introduced on a large variety of substrate materials.

"We are happy to report these excellent TiN results to our customers in micro- and optoelectronic industries. TiN is a central material in their applications, especially in components manufactured on GaN and on small, up to 200 mm diameter Si wafers. Picosun is specially dedicated to providing cost-efficient, turn-key production solutions for up to 200 mm wafer markets. We would like to welcome you all to meet us at the 4th China ALD conference which takes place 14-17 October 2018 in the city of Shenzhen, and where we are again the platinum sponsors, to discuss further how our ALD technology could improve your products and enable new breakthroughs in your industry," say Mr. Edwin Wu, CEO of Picosun Asia Pte. Ltd. and Mr. Jurgen Yeh, CTO of Picosun China Co. Ltd.

"It is always a pleasure to work with Picosun. The quality of their ALD equipment is outstanding and enables us to develop cutting-edge ALD processes to be introduced to our other collaboration partners in the industries. An immensely important benefit in using PICOSUN™ ALD tools is also the smooth scalability of the processes to production scale, as all PICOSUN™ ALD systems, from R&D units to full-scale industrial production platforms share the same core design and operating principles," continues Prof. Sunan Ding from the Nano-X lab of SINANO.

SINANO and Picosun have been collaborating since the beginning of 2017. The goal of the collaboration is to develop advanced micro- and optoelectronic components such as HEMTs (high-electron mobility transistors) and laser diodes, and lithium ion batteries utilizing ALD in their joint lab in Suzhou, one of China's most prominent hubs for electronics and other high-tech products manufacturing. The lab is equipped with



several state-of-the-art PICOSUN™ ALD systems. The collaboration is further supported by Picosun's local subsidiary, Picosun China Co. Ltd. also located in Suzhou.

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.

(*) For more information please visit:

<https://avs.scitation.org/doi/10.1116/1.5025557>

https://www.researchgate.net/publication/325279576_Remote_plasma-enhanced_atomic_layer_deposition_of_metallic_TiN_films_with_low_work_function_and_high_uniformity

The website of the 4th China ALD conference:

<http://www.c-ald.com/>

More information:

Mr. Edwin Wu, CEO, Picosun Asia Pte. Ltd.

Mr. Jurgen Yeh, CTO, Picosun China Co. Ltd.

Tel: +358 50 321 1955

Email: info@picosun.com

Web: www.picosun.com