ARRADIANCE *Sneak Preview*

Ecoresorbable and bioresorbable microelectromechanical systems

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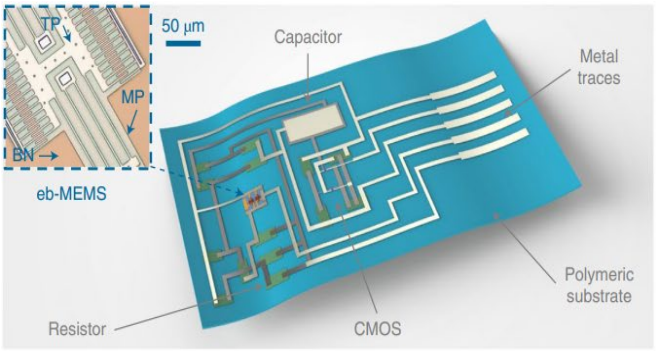
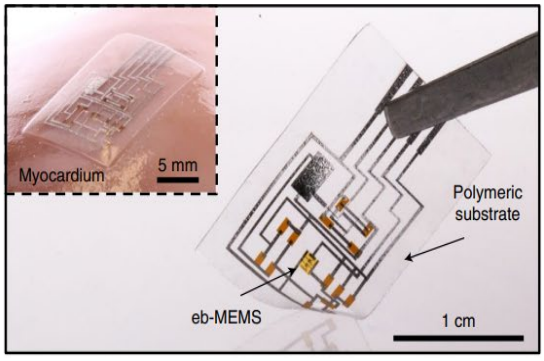
As microelectromechanical systems (MEMS) devices advance, the possibility of implantable MEMS medical devices promises a world of new diagnostic and treatment options for doctors and their patients. Ecoresorbable and bioresorbable MEMS (eb-MEMS) represent one exciting development. These devices are designed to physically dissolve after a set period of time to eliminate the need for surgical extraction and also reduce electronic waste (sustainability). However, one challenge of this technology is the need to protect these sensitive devices from physiological conditions due to the fragile 3D structures used in MEMS.

In this paper, authors Dr. Quansan Yang and Dr. Tzu-Li Liu from Northwestern University have used atomic layer deposition (ALD) to encapsulate eb-MEMS and as a liner for the electrical interconnects. The 20 nm SiO2 encapsulation layer in this research was deposited using a plasma-enabled atomic layer deposition system (GEMStar XT-P, ***Arradiance***). Additionally, SiO2 was used as insulation to prevent crosstalk between the tungsten and molybdenum wires. The Arradiance GEMStar XT-P deposits high quality plasma SiO2 films, enabling an extremely low water vapor penetration rate, resulting in a high dielectric constant and breakdown voltage. GEMStar provides excellent thickness control and enables deposition at low temperatures to avoid substrate and device damage. Use of ALD is rapidly growing and enabling the development of new technologies across a wide range of industries as represented in this paper published in the Nature Electronics journal.

Yang, Q., Liu, TL., Xue, Y. *et al.* *Nat Electron* **5**, 526–538 (2022) https://doi.org/10.1038/s41928-022-00791-1





If you would like more information or wish to inquire about a GEMStar ALD system or foundry ALD film deposition services, please contact Arradiance