Poster-Session

Selective area ALDeposition using µDALP™ - Precision coatings for Next Gen Devices.

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Spatial Atomic Layer Deposition (sALD) offers a unique opportunity for localized deposition due to its physical separation and isolation of precursor and co-reagent dosing [1]. Miniaturization of sALD requires substantial effort into the creation of suitable micro-nozzles [1]. Uniquely, ATLANT 3D has developed proprietary sALD micronozzles, called microreactor Direct Atomic Layer Processing - µDALPT.

The µDALPT process undergoes the same cyclic ALD process but is only done in a spatially localized area [2]. The microreactor or micronozzle confines the flows of gases used for ALD within a defined µm-scale area on the substrate, to deposit the desired material.

Since sALD and the µDALPT process are based on physical separation, it is compatible with any ALD material process however requires development as ALD processes are highly tool dependent [3]. As such, the material capabilities can match traditional ALD and exceed other patterning techniques, such as lithography, which can be costly and time-consuming, especially for rapid prototyping required for innovation [4,5].

Using a small amount of precursor multiple film materials and thicknesses can be deposited onto a single wafer within only a few hours, compared to days for a traditional ALD process. Films deposited with ATLANT 3D technology have been shown to produce high-quality, crystalline, atomically precise thin films used to fabricate temperature and capacitive sensors. Low-cost rapid prototyping facilitated by ATLANT 3D technology of such devices enables design innovation and optimization not possible with other thin film deposition techniques.

[1] Poodt P., JVSTA., 2012, 30, 010802
[2] Kundrata I., et al., Small Methods., 2022, 6 (5), 2101546
[3] Barry, S. T. Chemistry of Atomic Layer Deposition; De Gruyter
[4] Kundrata I., et al., ALD/ALE 2022 [Int. Conf.], 2022
[5] Plakhotnyuk M, et al., ALD/ALE 2022 [Int. Conf.], 2022