Supplemental Information

Electron Enhanced Atomic Layer Deposition of Aluminum Phosphide with Trimethylaluminum and Tritertbutylphosphine

Table 1. Summary of elemental composition in AlP films determined from in-situ Auger analysis.

Process at 300°C	C	O	P	Al	Si	P/Al
AlP ALD with TDMAA	22.1	12.7	19.7	12.5	33.0	1.58
AlP ALD with TMA	30.1	34.5	3.8	16.3	15.2	0.23
AlP ALA with TDMAA	17.9	5.8	12.3	39.6	24.5	0.31
AlP ALA with TMA	35.7	9	21.1	26	8.3	0.81

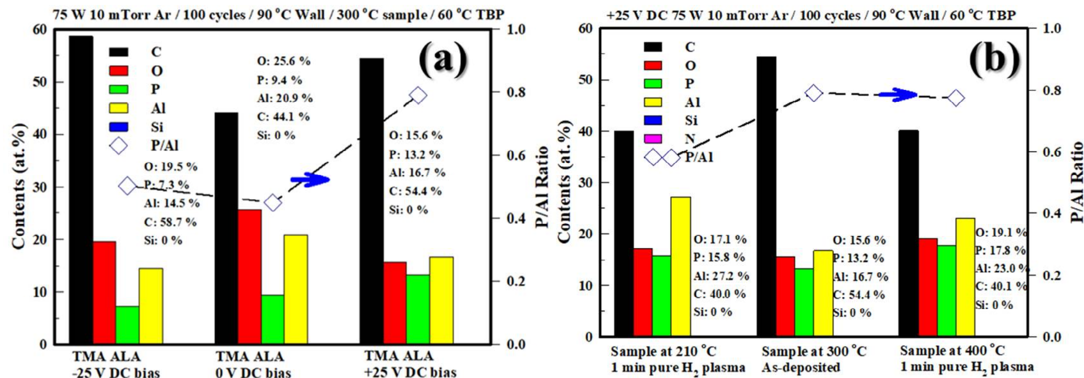

Figure 1. The elemental composition and P/Al atomic ratio for (a) AlP at 300 °C with -25 V, 0V, +25 V DC bias and (b) AlP with +25 V DC bias at 210°C, 300°C, 400°C.

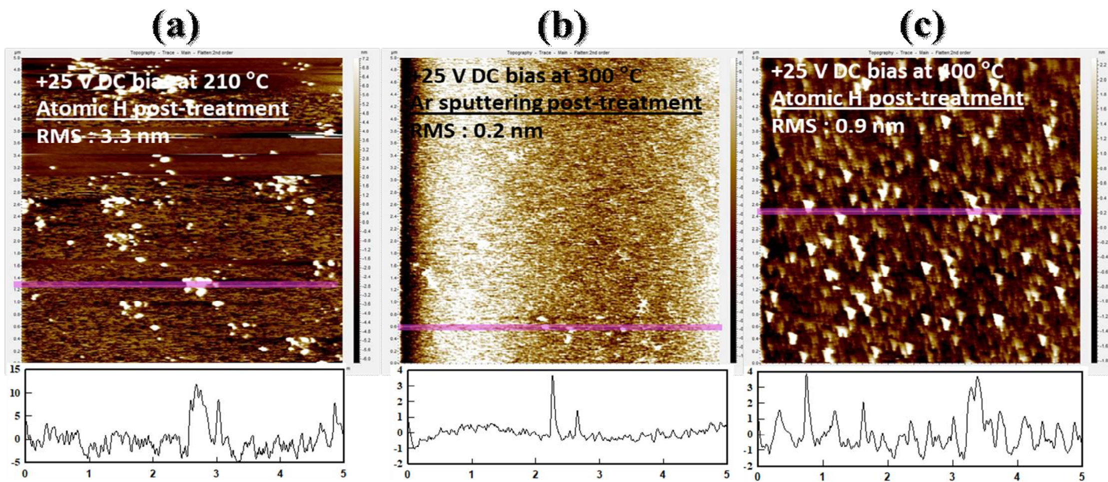

Figure 2. AFM images for (a) AlP at 210°C , (b) AlP at 300°C, and AlP at 400°C with +25 V DC bias.

References

1. M. Ishii et al., *Journal of Crystal Growth,* 180, **1997,** 15-21
2. Y. Terada et al,, *Journal of Crystal Growth,* 312, **2010,** 1359-1363
3. A. Gudovskikh et al., *Journal of Renewable and Sustainable Energy,* 10, **2018,** 021001
4. J. Sprenger et al., *Chemistry of Materials,* 28, **2016,** 5282-5294