The layer-by-layer growth of ferromagnetic $\tau$ phase MnAl thin films by Bias Target Ion Beam\textsuperscript{1} YISHEN CUI, WENJING YIN, JIWEI LU, STUART WOLF, Univ of Virginia — It is well known that the metastable $\tau$ phase of MnAl has a L10 structure (chemical ordering along [001] directions) and is the only ferromagnetic phase of this binary intermetallic. In our study, alternating Al/Mn quasi-monolayer deposition was developed using a novel Bias Target Ion Beam deposition technique, that enabled precise control of the microstructural growth. We have obtained epitaxial $\tau$ phase MnAl thin films (~10 nm thick) on single crystal MgO substrates with improved saturation magnetization and anisotropy in comparison with co-sputtered ultra thin films. We will discuss the microstructure and magnetic behaviors of MnAl films in detail.

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