Thin films of ever reducing thickness are used in a plethora of applications and their performance is highly dependent on their microstructure. Computer simulations could then play a vital role in predicting the microstructure of thin films as a function of processing conditions. FACET is one such software tool designed to model polycrystalline thin film growth, including texture evolution and grain growth of polycrystalline films in 2D. FACET represents each grain in terms of their crystallographic surface facets and grain boundaries. It includes several options for defining nucleation, and then models deposition and the growth of the nuclei and the film, for various types of deposition conditions. FACET runs on any windows based operating system, is very user friendly, can simulate films in real-time or faster and has the ability of visualizing the film growth as it evolves.

Several modifications to the original FACET code were done to enhance its usability and accuracy. Simulations of sputtered silver thin films are presented here with FACET 2.0 with qualitative and semi-quantitative comparisons with previously published experimental. Experimental depositions of Silver films are also attempted with varying substrates and thickness in order to generate complementary experimental and simulation studies of microstructure evolution. Comparisons of grain size, texture and film thickness between simulations and experiments are presented which attempt to describe growth modes due to various deposition factors like flux angle and substrate temperature. Overall, FACET provides interesting insights into thin film growth processes, and the effects of various deposition conditions on thin film structure and microstructure. Lastly, simple molecular dynamics simulations of deposition on bicrystals are attempted for gaining insight into texture based grain competition during film growth.

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