ABSTRACT

PROFILE ENGINEERED THIN FILM DEVICES AND STRUCTURES

The present invention relates to electrically active devices (e.g., capacitors, transistors, diodes, floating gate memory cells, etc.) having dielectric, conductor, and/or semiconductor layers with smooth and/or dome-shaped profiles and methods of forming such devices by depositing or printing (e.g., inkjet printing) an ink composition that includes a semiconductor, metal, or dielectric precursor. The smooth and/or dome-shaped cross-sectional profile allows for smooth topological transitions without sharp steps, preventing feature discontinuities during deposition and allowing for more complete step coverage of subsequently deposited structures. The inventive profile allows for both the uniform growth of oxide layers by thermal oxidation, and substantially uniform etching rates of the structures. Such oxide layers may have a uniform thickness and provide substantially complete coverage of the underlying electrically active feature. Uniform etching allows for an efficient method of reducing a critical dimension of an electrically active structure by simple isotropic etch.

FIG. 4D