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PROCESS FOR FABRICATING LOW LEAKAGE CURRENT LPCVD Ta₂O₅ FILMS

ABSTRACT OF THE DISCLOSURE

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A process for fabricating Ta₂O₅ films for capacitor dielectrics of semiconductor memory devices such as stacked DRAM having low leakage current characteristics is disclosed. The process comprises the steps of first preparing a semiconductor silicon substrate carrying an NH₃-nitrided polysilicon electrode layer. A Ta₂O₅ film is then deposited over the surface of the electrode layer. The deposited Ta₂O₅ film is then annealed in a furnace in N₂O gas at a temperature of about 800 °C for about 30 minutes. The novel post-deposition annealing procedure yields Ta₂O₅ film for semiconductor memory device capacitor dielectrics having low leakage current, good reliability, and is particularly suitable for batch processing in conventional oxidation furnaces.

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(Fig. 1b)