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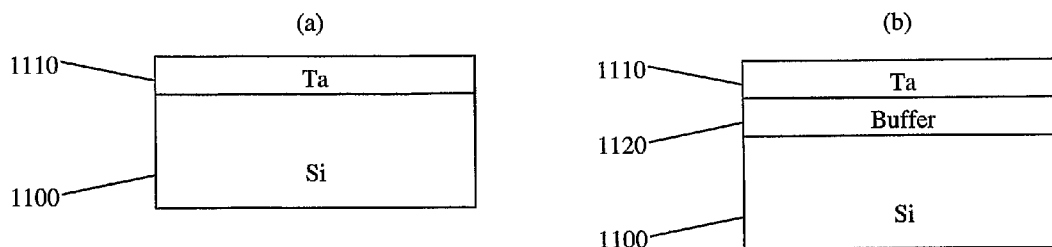
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(54) Title: METHODS OF FORMING ALPHA AND BETA TANTALUM FILMS WITH CONTROLLED AND NEW MICROSTRUCTURES

Schematic cross-section view of formation Ta films **1110** on silicon substrate **1100** without buffer (Figure 1(a)) and with buffer layer **1120** (Figure 1(b)).(Narayan)



(57) Abstract: Thin tantalum films having novel microstructures are provided. The films have microstructures such as nanocrystalline, single crystal and amorphous. These films provide excellent diffusion barrier properties and are useful in microelectronic devices. Methods of forming the films using pulsed laser deposition (PLD) and molecular beam epitaxy (MBE) deposition methods are also provided, as are microelectronic devices incorporating these films.