

Observation Of $\text{Ag}_x\text{In}_{1-x}$ Alloy Formation On The Polycrystalline Tungsten Surface

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Abstract:

Low-dimensional character of ultrathin films gives possibility to observe the process of alloying of two different metals within an ultrathin overlayer on a nonalloying substrate surface. The extent of surface alloying depends on composition, order of deposition and annealing temperatures.

Layer-deposited indium and indium alloy films are often applied to improve ohmic contacts of GaAs, GaN and chosen $\text{A}^{\text{II}}\text{B}^{\text{VI}}$ semiconductors. Knowledge of the processes occurring during alloying of indium and indium-alloy component (Au, Ag, Pd) is of great importance from the point of view of practical applications..

In the present study we have investigated the process of intermixing of ultrathin indium and silver layers deposited on polycrystalline tungsten surface. The process of In and Ag alloying was controlled by means of angle-resolved ultraviolet photoemission from valence states and In4d level, as well as by photoelectron spectroscopy of Ag and In core levels. It was found that alloying starts at room temperature and becomes completed after a short anneal at 600 K. Process of alloying was found to be purely geometrical and no significant difference between two-dimensional and three-dimensional bulk alloys was observed.