Diffusion of co-sputtered refractory metal films on Si substate at high temperature

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Polycrystalline solar cell is one of the commercially feasible solution for harvesting photon. In the process of production of polysilicon, silicon core rod should be pre-heated to high temperature because of high resistance of silicon at room temperature. If the silicon core rod is replaced with other low resistive materials, polysilicon can be produced at lower cost. In this work, refractory metals such as tungsten, molybdenum and tantalum were selected as candidates of core rod materials. W-Mo, Ta-Mo, W-Ta-Mo films were deposited on Si substrate at 120℃ by co-sputter system. The prepared samples were annealed at 800℃ and 1000℃ for 1 hour. Scanning electron microscopy(SEM), transmission electron microscopy (TEM), X-ray diffractometer(XRD), and auger electron spectroscopy (AES) were employed to study the microstructure and the morphology.