

Diffusion coefficients of tungsten and molybdenum at high temperature

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The increasing demand for the polysilicon used for the fabrication of solar cells requires many countries to produce it for themselves. In Siemens reactor, the trichlorosilane gas reacts with the hydrogen gas and the polysilicon is deposited on the silicon core rod throughout the CVD reaction. However the specific resistance of the silicon is so high that preheating of the core rod is required. Therefore the metal core rod and the diffusion barrier were tested in our previous research.

In this report, we deposited the tungsten nitride diffusion barrier layer and the tungsten or molybdenum metal on the silicon wafer by using co-sputtering. In order to investigate the thermal stability of the diffusion barrier at high temperature, the samples annealed at the various temperatures were analyzed by SEM and AES. The sheet resistance and the XRD analysis were performed to observe the crystallization as the temperature was increased. From the TEM-EDS, the diffusion coefficients of tungsten and molybdenum were calculated by single diffusion model.