

The purpose of this thesis is a study of sensing properties of pure, platinum-doped and gold-doped tungsten oxide thin films. Required films were prepared by magnetron sputtering on glass and passivated silicon. Their chemical composition was investigated by XPS. The morphology of the films was measured using AFM and SEM. Sensing response of these films to hydrogen was investigated in the range from 1,000 to 10,000 ppm and temperatures between 100 and 350 °C. It was found that platinum oxides PtO<sub>2</sub> and PtO were partially reduced during the sensing tests. The possible encapsulation of the platinum by the tungsten oxide was discovered. The sensitivity of the metal doped films was much higher than the sensitivity of the pure films. In the case of platinum-doped films the sensitivity decreased with increasing temperature in contrast to the gold-doped films where the sensitivity increased. The gold was present in two metallic and oxidized states. The gold was reduced during the reactions with hydrogen. After the sensing tests, the size of crystalline grains increased and the platinum-doped films became coarser.