

**Title:** Study of physical and chemical properties of surface-modified tungsten oxide

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**Abstract:** This work can be divided into two parts. In the first part, we examine possibilities of preparation of monocrystalline tungsten and tungsten oxide nanoclusters by means of magnetron sputtering with gas aggregation. Clusters are prepared in the non-reactive (Ar) and reactive (Ar + O<sub>2</sub>) atmosphere and heated after the deposition or during the flight by IR radiation. Influence of oxygen in the aggregation process was described and possibilities of generating crystalline tungsten and tungsten oxide clusters were found. In the second part, we study reactivity of tungsten oxide layers, pure and doped with rare metals (Pt, Au), deposited on the silicon wafer and etched carbon, towards partial methanol oxidation. Influence of carbon substrate and metal dopants on reactivity was found and described, along with morphological and chemical changes that occurs in the sample during the process.

**Keywords:** catalysis, tungsten oxide, clusters, partial oxidation of methanol, etched carbon