

Hot-filament chemical vapor deposition applied for the growth of pyramidal  $WO_3$  thin film and its chemical sensor application

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This paper describes the controlled hot filament chemical vapor deposition (HF-CVD) process for preparing the uniform porous tungsten oxide ( $WO_3$ ) thin film on silicon substrate. For  $WO_3$  thin film on Si substrate, the gasification followed by heating of tungsten (W) source was performed and maintained a low substrate temperature of 300°C. The prepared  $WO_3$  thin film owned highly porous pyramidal like nanostructures and possessed reasonably high surface to volume ratio. The structural, crystalline and compositional observations confirmed that the grown  $WO_3$  film exhibited the classic monoclinic crystal structure with excellent crystal quality. The grown  $WO_3$  film was employed as electro-active electrode for the detection of diethyl amine chemical to evaluate the chemical sensing behavior.