ENHANCED GAS SENSING VIA SURFACE MODIFICATION OF METAL OXIDES

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Carbon monoxide is one of the most important reducing gases to be detected in combustion of hydrocarbon fuel, petroleum and automobile industries, heat treating furnaces and also in the first stages of fire. Given its toxicity both in the event of short-term and long-term exposure, its continuous monitoring and quantification are of prime importance. Here, we report the development of fast-responding ceramic oxide-based chemical sensors for CO. These sensors have been realized by proper chemical variation and tailoring the morphological features of molybdena, tungsta and titania thick films via an innovative redox scheme. The chemiresistor sensors were made on an alumina substrate pre-decorated with gold interdigitated electrode pattern. The films were modified via gas phase oxidation and reduction in precisely controlled pO2 regimes and tested for their response towards CO in ambient air at 450°C. The sensor response was accentuated due to the surface treatment given to the film. This is corroborated by the structural and microstructural modification of the film surfaces. Shorter response time, fast recovery and repeatability over several cycles were some of the benign sensor features.