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**Insights into the enhanced tolerance to carbon monoxide on model tungsten trioxide-decorated polycrystalline platinum electrode**

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**Abstract**

Polycrystalline platinum decorated by WO<sub>3</sub> nanoparticles (WO<sub>3</sub>/Pt<sub>pc</sub>) is used as a model electrode to gain insights into the enhanced tolerance to carbon monoxide (CO) observed on such composite materials. Bifunctional-type reactions involving WO<sub>3</sub> and Pt active sites are observed, such as hydrogen spill-over or the electrooxidation of CO molecules adsorbed on Pt sites neighboring the WO<sub>3</sub> nanoparticles. The resulting CO<sub>ad</sub>-free Pt sites are active for the hydrogen oxidation reaction (HOR), thereby enhancing the HOR activity for WO<sub>3</sub>/Pt<sub>pc</sub> electrode relatively to bare Pt<sub>pc</sub> in 300 ppm CO/H<sub>2</sub> saturated HClO<sub>4</sub> electrolyte. However, this bifunctional effect occurs exclusively for CO molecules weakly adsorbed on Pt, *i.e.* only for a small fraction of the CO<sub>ad</sub> fully covering the Pt surface.

Keywords: platinum; tungsten oxide; CO-tolerance; hydrogen oxidation; PEMFC; PEFC

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