

## Activity of non-noble metals catalysts in different electrochemical energy conversion processes in acid and alkaline media

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**Summary:** This presentation first describes, as introductory issue, some general aspects of the Brazilian electric energy scenario, which is followed by discussions on performance of carbon and iron based electrocatalysts submitted to different nitrating processes, for the promotion of the oxygen, water and carbon dioxide reduction reactions in different electrolytes. The catalysts have been prepared using carbon powder supports, which are impregnated with the  $\text{Fe}^{2+}$ (2,4,6-Tris (2-pyridyl)-1,3,5-triazine)<sub>2</sub> complex ( $[\text{Fe}(\text{TPTZ})]^{2+}$ ) and then treated at different temperatures in the range of 700-950 °C, in nitrogen and ammonium atmospheres. All materials have been characterized by x-ray diffraction (XRD), x-ray photoelectron spectroscopy (XPS), transmission electron microscopy (TEM), High angle annular dark field STEM (HAADF-STEM), and energy dispersive spectroscopy (EDS), while the electrochemical investigations have been performed with the catalytic materials forming thin films deposited on glassy carbon disc and carbon cloth substrates. Experiments for the oxygen reduction reaction (ORR) have been carried out in acid media, using the rotation ring-disk electrode (RRDE) technique. On the other hand, the carbon dioxide and the water reduction reactions were investigated in  $\text{CO}_2$ -saturated 0.1 M  $\text{KHCO}_3$  solutions, under potentiodynamic and potentiostatic conditions, by on line differential electrochemical mass spectrometry (DEMS) and in line gas chromatography (GC).