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Electrocatalysis of the nitrite reduction : a mechanistic study

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Propositions

accompanying the thesis

Electrocatalysis of the nitrite reduction *a mechanistic study*

1. Humans continue to transform the global nitrogen cycle at a record pace, reflecting an increased combustion of fossil fuels, growing demand for nitrogen in agriculture and industry, and pervasive inefficiencies in its use. Much anthropogenic nitrogen is lost to air, water, and land to cause a cascade of environmental and human health problems.

J.N. Galloway et al in Science, 2008, 320, 889-892

2. The actual catalytic reduction of nitrate usually gives rise to a host of products and few, if any, practical catalysts are able to attain 100% selectivity to N_2 .

Chapter 1 of this thesis.

3. The disadvantage of the " N_2O " pathway is that[...] selectivity to N_2 is always far below 100%. On the other hand, the $NH_x + NO$ route involves two strongly adsorbed intermediates and has the potential to generate 100% N_2 .

Chapter 4 of this thesis

4. The cathodic corrosion method can successfully be applied to the preparation of preferentially-shaped Pt nanoparticles, producing "cuboid" nanoparticles with a percentage of (100) sites as high as 59%.

Chapter 5 of this thesis

5. It is not easy to predict the ways of development of electrochemistry in the coming years. Prior experience shows that simple extrapolation from earlier behavior not always leads to satisfactory results.

Z. Galus, in J. Solid State Electrochem., 2011, 15, 1777-1790

6. Chemistry is closer to the human scale than physics.

R.Hoffmann, in Nature, 2011, 480, 179

7. What science teaches us is not fulfillment in the act of finding, but beauty awakened in the moments of searching.

V. Uskoković, in Found. Sci., 2010, 15, 303-344

8. Science is like chess, and there are two ways of playing: one involves trying all conceivable combinations of moves; the other aims at the expansion of the chessboard.

9. The research group is the modern analogue of the art workshops of the Renaissance.
10. Science will reconcile with Art once it becomes just as useless.
11. Life is a process of becoming, a combination of states we have to go through. Where people fail is that they wish to elect a state and remain in it. This is a kind of death.
Anaïs Nin, in D. H. Lawrence: An Unprofessional Study
12. Rigore è quando arbitro fischia ("Penalty kick is when referee whistles").
Vujadin Boškov, coach of the Scudetto-winning U.C. Sampdoria in 1990-91).