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Designing of stable and highly efficient ordered Pt₂CoNi ternary alloy electrocatalyst: The origin of dioxygen reduction activity

Moorthi Lokanathan^{a,b}, Indrajit M. Patil^{a,c}, M. Navaneethan^d, Vanshree Parey^a, Ranjit Thapa^{a,b*},

Bhalchandra Kakade^{a,c*}

^aSRM Research Institute, SRM University, Kattankulathur - 603203, Tamil Nadu, India.

^b Department of Physics and Nanotechnology, SRM University, Kattankulathur - 603 203, Tamil Nadu, India.

^cDepartment of Chemistry, SRM University, Kattankulathur - 603 203, Tamil Nadu, India.

^dResearch Institute of Electronics, Shizuoka University, 3-5-1 Johoku, Naka-Ku, Hamamatsu, Shizuoka 432-8011, Japan.

bhalchandrakakade.a@res.srmuniv.ac.in

ranjit.t@res.srmuniv.ac.in

** Corresponding author email address:*

Abstract

We report an ordered Pt₂CoNi ternary alloy nanoelectrocatalyst, synthesized via simple molten salt synthesis (MSS) procedure and also defined theoretically a new descriptor to explain the origin of exceptional oxygen reduction reaction (ORR) activity. The catalyst consists of a very thin layer of carbon, since the seed-growth of such ordered Pt₂CoNi nanoelectrocatalyst has been originated through the pores of high surface area carbon during a MSS. Electrocatalytic ORR activity of Pt₂CoNi nanoelectrocatalyst is 5-6 times higher than that of commercial Pt/C catalyst with fascinating stability behavior in acidic media. Most interesting behavior of this Pt₂CoNi has been observed after 15,000 and 25,000 durability cycles, where 16 times activity enhancement is achieved at 0.9 V. Furthermore, after 25,000 cycles, a specific activity of 0.605 mA/cm²_{Pt} (22

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