



SDI Review Form 1.6

Journal Name:	International Research Journal of Pure and Applied Chemistry
Manuscript Number:	2014_IRJPAC_9624
Title of the Manuscript:	Support Material Effect for Pt Catalytic Activity
Type of the Article	Original Research Article

General guideline for Peer Review process:

This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty**', provided the manuscript is scientifically robust and technically sound.

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PART 1: Review Comments

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
Compulsory REVISION comments	- Line 108,109 and 120, Author mention that samples are characterized by XRD and TG/DTA but result of XRD and TG/DTA not found in manuscript. - Line 226-288, how Pt subnano-clusters are responsible for causing ORR activity of Pt-GNS and Pt-NG. - Line 244, It is indicated that GNS and N-G significantly influence the π-d in terms of Pt electronic structure. But, too, no arguments or clear description is given to illustrate it. Even if this effect has no big influence, arguments anyway are needed.	Thank you very much for your comments. I have modified my manuscript as your suggestion in yellow part below as: "XRD and TG/DTA data can be seen in supporting information (Figure 1S and 2S)". Thank you very much for your comments. I have modified my manuscript as your suggestion in yellow part below as: "Therefore, the Pt subnano-clusters and graphene are responsible for causing high ORR catalytic activity of Pt/GNS. I consider two factors, those are i) Enthalpy factor ascribes the interface interaction Pt-C via the π-d hybridization. It is possible due to the reactivity of graphene's π-conjugated states, and ii) Entropy factor. GNS has large surface area. It is required for high dispersion of small Pt Particles". Thank you very much for your comments. I have modified my manuscript as your suggestion in yellow part below as: "XPS data (Figure 3) shows that interaction between Pt and CB is normally



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		Pt because binding energy of Pt does not shift to higher binding energy. It means interaction between Pt and CB is weak. It is not good catalyst due to support material can release during extent use and also Pt can be blocked by the other compound. In contrast, the binding energy of Pt/GNS and Pt/N-G shift to higher binding energy, indicating strong interaction between Pt and graphene. It is possible due to graphene and Pt has π-conjugated and d-orbital, respectively. Thereby, Pt electronic states are modulated on GNS due to π-d hybridization”.
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Minor REVISION comments	1. Line 132-134, statement of this these line not clear. Author should clear this statement what he want to say. 2. Line 183,184, author write “this data indicates the catalyst support material affects the diffusion limiting currents values” where is this data in your manuscript. 3. Raman spectroscopy has been widely applied to exploit the structural and electronic properties of graphene, including layer numbers, stacking order, strain effect, and doping concentration. Author should consider the use of a more suited analysis technique (e.g. Raman spectroscopy) in addition. 4. Conclusions need more clarity, more emphasis on the main result of the paper. It should be revised.	Thank you very much for your comments. I have modified my manuscript as your suggestion in yellow part below as: “The amounts of catalysts loading on the glassy carbon are 20 µg for both GNS and N-G. The rotating ring disk electrode (RRDE) polarization curves of GNS and N-G was obtained in O₂-saturated 0.1 M HClO₄ solution”. Thank you very much for your comments. We can see the diffusion limiting currents values in Figure 1. All of the catalysts have the diffusion limiting currents values below 0.4 V versus RHE. Thank you very much for your comments. I will consider to do as your suggestion at the next publication. Thank you very much for your comments. I have modified my manuscript as your suggestion in yellow part below as: “In this study, the GNS and N-G were used as supporting materials to deposit Pt particles in order to investigate the support material effect for ORR activity. The ORR activity of Pt/GNS is higher than Pt/N-G catalysts. This suggests that the modification of π states by the N-doping change the properties of the interaction between Pt and carbon. The interaction between Pt and
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		graphene is considered to be π -d hybridization. Therefore, one can control the electronic structure of graphene and Pt by doping of some elements. On the other hand, since the particle sizes and binding energies are similar and the surface areas are different, the difference between GNS and N-G is related to surface area. The greater surface area has more sites on which the oxygen binding is very strong. It also causes the ORR catalytic activity of Pt/N-G is lower than Pt/GNS".
<u>Optional/General</u> comments		