

ELECTROCHEMICAL REDUCTION OF OXYGEN IN ALKALINE SOLUTION ON Pd/C CATALYSTS PREPARED BY ELECTRODEPOSITION ON VARIOUS CARBON NANOMATERIALS

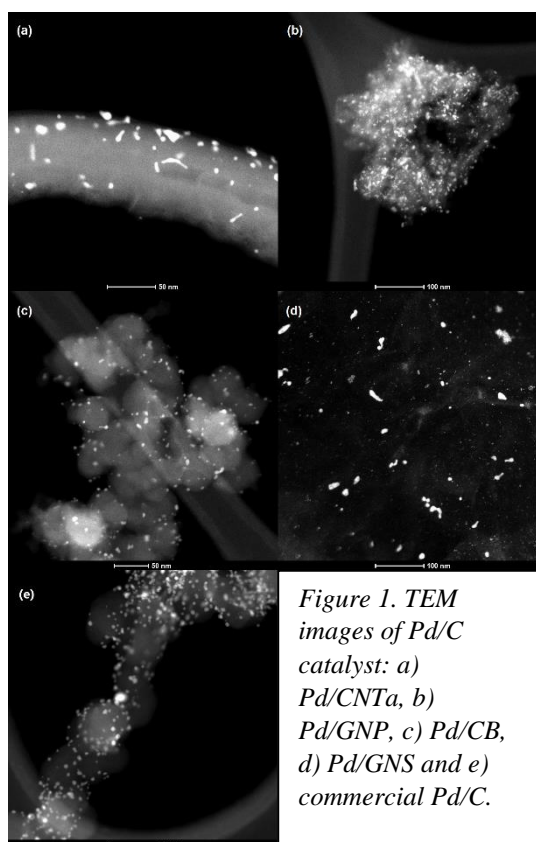
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In recent years there have been multiple studies trying to improve the catalytic activity of Pd based Pd/C catalysts [1]. One method which can be used to tailor suitable Pd nanostructures on different carbon materials is electrodeposition. In this work Pd catalyst was deposited onto different carbon materials (graphene nanoplatelets (GNP), graphene nanosheets (GNS), carbon nanotubes (CNT) and carbon black (CB) and mixture of CNT and GNP) [2]. Electrodeposition was carried out with pulses and was conducted at two overpotentials to see the influence of overpotential on the deposition process. Two different deposition potentials were used 0 and -0.25 V vs SCE. From particles counted on TEM images it is evident that higher overpotential provided smaller particle sizes. Best Pd particle dispersion was achieved on graphene nanosheets. It is also evident that the particle size of deposited Pd depended on the supporting material, with smallest particles deposited on GNS. Best specific activity for oxygen reduction in 0.1 M KOH was obtained with Pd/GNS catalyst. Depositing on CNTs larger agglomeration was observed with low electrochemical surface areas. In order to improve this, the CNTs were activated electrochemically, which significantly increased the deposited Pd electroactive surface area.



References

- [1] H. Erikson, A. Sarapuu, J. Solla-Gullon, K. Tammeveski, J. Electroanal. Chem. 780 (2016) 327-336.
- [2] M. Lüsü, H. Erikson, M. Merisalu, M. Rähn, V. Sammelselg, K. Tammeveski, J. Electroanal. Chem. 2019 (accepted)



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