Abstract Submitted
for the GEC10 Meeting of
The American Physical Society

Novel method to produce catalysts for oxygen reduction reaction by dual plasma process CHRISTIAN WALTER, VOLKER BRÜSER, ANTJE QUADE, KLAUS-DIETER WELTMANN, Leibniz Institute for Plasma Science and Technology — Polymer electrolyte membrane fuel cells (PEMFCs) have been recognised as a potential future power source for zero emission vehicles. Today, Pt is the only efficient catalyst for the oxygen reduction reaction (ORR) in PEMFCs. But for reasons of availability and cost efficiency there is a great desire to replace Pt with inexpensive and abundant catalysts (Non-noble-metal catalysts (NNMCs)). Metal (Co/Fe)/N/C composites have emerged as the most promising alternatives within the NNMcs. Those composites are presently mostly produced by pyrolisation, either of Co- and Fe-N_4-macrocycles or of separately introduced metal and nitrogen precursors. It has already been shown that a dual PECVD/PVD process can also be used to produce metal-polymer composites with different properties [1]. Here we use such a process with pyrrole as nitrogen precursor and cobalt as metal to obtain novel catalytically active compounds. Since it is also known that some Co-N_4-macrocycles can be further improved by using a plasma process instead of pyrolysis, it is promising to produce NNMCs with only a plasma process. FT-IR, XPS, XRD, BET and electrochemical measurements of so-produced samples are presented and discussed.

[1] C. Walter et al.; *Plasma Process. Polym.*; **2009**, 6, 803-812

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Date submitted: 10 Jun 2010 Electronic form version 1.4