Cost and durability are the two major barriers hindering the mass production of fuel cell vehicles, in which the loading of the Pt based electrocatalyst at the cathode of fuel cells is one of the key determinants [1]. To reduce the Pt loading in fuel cells, electrocatalysts with improved activity and durability for oxygen reduction reaction (ORR) are most desired [2]. With today’s Pt metal price, a 4-8-fold enhancement of the ORR Pt-mass-activity over the state-of-the-art Pt/C catalyst without compromise of durability is required to meet the auto-competitive cost target of fuel cell vehicles.

A variety of advanced electrocatalysts show improved ORR activity and durability compared to the commercial Pt/C catalyst [3]. Those include Pt-alloy catalysts, Pt-monolayer catalysts, core-shell catalysts, facet-controlled crystalline Pt-alloy catalysts and so on [4-6]. In this presentation, several issues will be discussed with the low-Pt advanced electrocatalysts for fuel cell applications. An easy and controllable synthetic approach will be introduced for the development of Pt-alloy electrocatalysts, with improved activity and durability in fuel cell tests.

Acknowledgements: This work is financially supported by the 863 program of China MOST under the contract number 2013AA110202, and by the NSFC under the contract number 21373135.

References: