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Nano carbon supported platinum catalyst interaction behavior with perfluorosulfonic acid ionomer and their interface structure

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Graphical abstract

Highlights

- Keq.was determined for adsorption between Nafion ionomer and Pt on Nano carbons
- Porosity and surface oxygen groups was found important for the adsorption
- The adsorption strength is relate to the catalyst electrochemical durability
- The ionomer adsorption location is related to the decomposition temperature of carbon
- Interface structure study is essential for the catalyst development

Abstract

The interaction between perfluorosulfonic acid ionomer and supported platinum catalyst is essential. It directly influences platinum accessibility, stability of carbon support and platinum, proton conductivity and electron conductivity in an electrode. In this study, we compare the adsorption behavior of Nafion ionomer on platinized carbon nano fibers (CNFs), carbon nano tubes (CNTs) and amorphous carbon (Vulcan). The interaction is affected by the catalyst surface oxygen groups as well as porosity. Comparisons between the carbon supports and platinized equivalentsare carried out. It reveals that the platinization step modifies the surface nature of the carbon supports in