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Positively charged carbon electrocatalyst for enhanced power performance of L-ascorbic acid fuel cells

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Abstract

Carbon surface with large oxygen and carbon ratio (O/C) indicated an outstanding electro-catalytic activity toward L-ascorbic acid oxidation, compared to platinum group metals. However, interrelation of surface functional groups and its electro-catalytic activity is still unclear. In this paper, we prepared different levels of oxidized carbons by a simple acid treatment and investigated the correlation between the surface oxygen functional groups of acid-treated carbon and electro-catalytic activity in an electro-oxidation of L-ascorbic acid. Positively charged carbon was demonstrated by lone pair electron of oxygen from valence band spectra study. It was revealed that the positively charged carbon, especially involved in carbonyl, showed enhanced the electro-catalytic activity through both better adsorption of negatively charged reactants and lowered LUMO by electronegativity of oxygen.

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