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Core-Shell Structure Nanomaterials Ceria-Nickel CatalyzesCarbon Oxidation in a Molten Hydroxide Direct Carbon Fuel Cell

Xiaofeng Li, Yanfang Gao *

College of Chemical Engineering, Inner Mongolia University of Technology.

Abstract

The molten hydroxide direct carbon fuel cell uses moltenhydroxide (NaOH or KOH) as the electrolyte which is containedwithin a metallic container which also acts as a cathode. A carbonrod made from graphite or coal derived carbon is dipped into theelectrolyte and used as both the fuel and anode of the cell.Such a systemwasconsidered to havea number of advantages over the molten carbonate electrolyteDCFC. The advantages of using sodium hydroxide electrolyteinclude high ionic conductivity (especially when associated withwater) [1, 2], high reactivity towards carbon [3] anda low melting point [4].

Nanostructured ceria-nickel is an innovativecatalyst concept with aconfiguration that is inverted relative to that of a conventional supported catalyst, which maybe a “sushi”-type structure. Carbon oxidation is supposed to be efficiently promoted by maximizing the nickel-ceria interfaceto activate oxygen species, increasing the contact between ceriaand carbon to facilitate spillover ofactive oxygen onto the carbon at large distances, and covering nickel with ceriaparticles to prevent nickel sintering.The nanocatalyst with special structure was mixed with lignite pyrolysis carbonto enhance the oxidation activity of anodic carbon fuel, and the mixture is acted anodic carbon fuel for molten hydroxide direct carbon fuel cell.

Biography:

Yanfang Gao has completed her PhD at the age of 30 years from Fukui University and postdoctoral studies from Tsinghua University of Chemistry. She is a professor at the department of Inner Mongolia University of Technology, a tutor of a PhD student. She has published more than 30 papers in reputed journals.

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