

**Abstract**

The operating life of a fuel cell is expected to be thousands of hours. One of the critical components of the fuel cell that will allow for such long-life cycle is the catalyst-support material. The support material is expected, amongst others, to be electrically conductive, strongly interact with the catalyst, possess large surface area, and be corrosion-resistant. This chapter provides the readers with the physico-chemical properties of the traditional support materials (i.e., carbons) and also the emerging support materials being reported in the literature as a means of alleviating some of the challenges associated with carbon supports. The need for the emerging materials arises mainly from the electrochemical corrosion of carbon materials as catalyst-supports in fuel cells (FCs) leading to electrical isolation of the catalyst particles and Ostwald ripening as well as decrease in the electrochemically-active surface area (EASA) of the catalyst. Although the chapter summarizes much of the historically significant work on various catalyst supports for Direct Alcohol Fuel Cells (DAFCs), as far as possible, the most recent developments are accentuated. References are made to other reports that have reviewed similar subject matter for specific cases of supports used in the field for ease of reference by readers. In addition, the basics of fuel cell technology is included which will hopefully serve as an introductory note to scientists and entrepreneurs who are technically new to the field.