OMICS Group Conferences
Accelerating Scientific Discovery

International Conference and Expo on
Materials Science & Engineering

October 22-24, 2012 DoubleTree by Hilton Chicago-North Shore, USA

Characterization of a composite eletrolyte for direct Ethanol fuel Cells

Deyse Elisabeth Ortiz Suman Carpenter[4], Beatriz Arnold Bern[1], Stephen David Carpenter[2] and Maria Madalena de Camargo Forte[3]
[1,2,4]University of Blumenau, Brazil
[3]Federal University of Rio Grande do Sul, Brazil

Proton Exchange Membrane Fuel Cells (PEMFC) are devises that produce energy from renewable sources generating none or little pollution. The literature presents an enormous amount of research on this subject as the need for alternative methods to generate energy has been increasing to cope with the consumption required by the technology. A PEMFC may have its source of hydrogen from an internal reform of alcohols. When the system uses ethanol a few problems arise related to the cross over of the molecule leading to a decrease on the cell performance. In order to minimize this problem composites membrane have been studied. This work aimed to develop a composite membrane for fuel cell by mixing clay, kaolin and halloysite to a Nafion polymer matrix, in order to improve retention of alcohol molecules. This application requires the elimination of ethanol cross over to maintain the proton conductivity of the system. The composite membranes Nafion/Kaolin, Nafion/Halloysite and Nafion/Halloysite functionalized. The Halloysite were prepared in proportions of 0.5, 1.0 and 1.5% by weight. The membranes obtained were characterized according to the permeability of ethanol, its proton conductivity and water uptake. The morphology and structure of the composite membrane were characterized by SEM and EDX, and the thermal behavior by DSC and TGA. The results showed a reduction of 48% up to 63% in the permeability of ethanol. However, the results of proton conductivity for all the samples were lower than Nafion. In relation to the thermal behavior, the composite Nafion membranes were stable until the temperature of 325 °C.

Biography

Deyse Carpenter has got her Ph.D degree from Birmingham University, UK, followed by a research fellowship at the same university. Her postdoctoral studies were undertook at Manchester University, UK. She is Course Coordinator and a Senior lecturer at the University of Blumenau, Brasil. Her research interests are on fuel cells, corrosion and surface treatment. She is a member of the editorial board of The Transaction of the Institute of Metal Finishing Journal.

deysec@yahoo.com