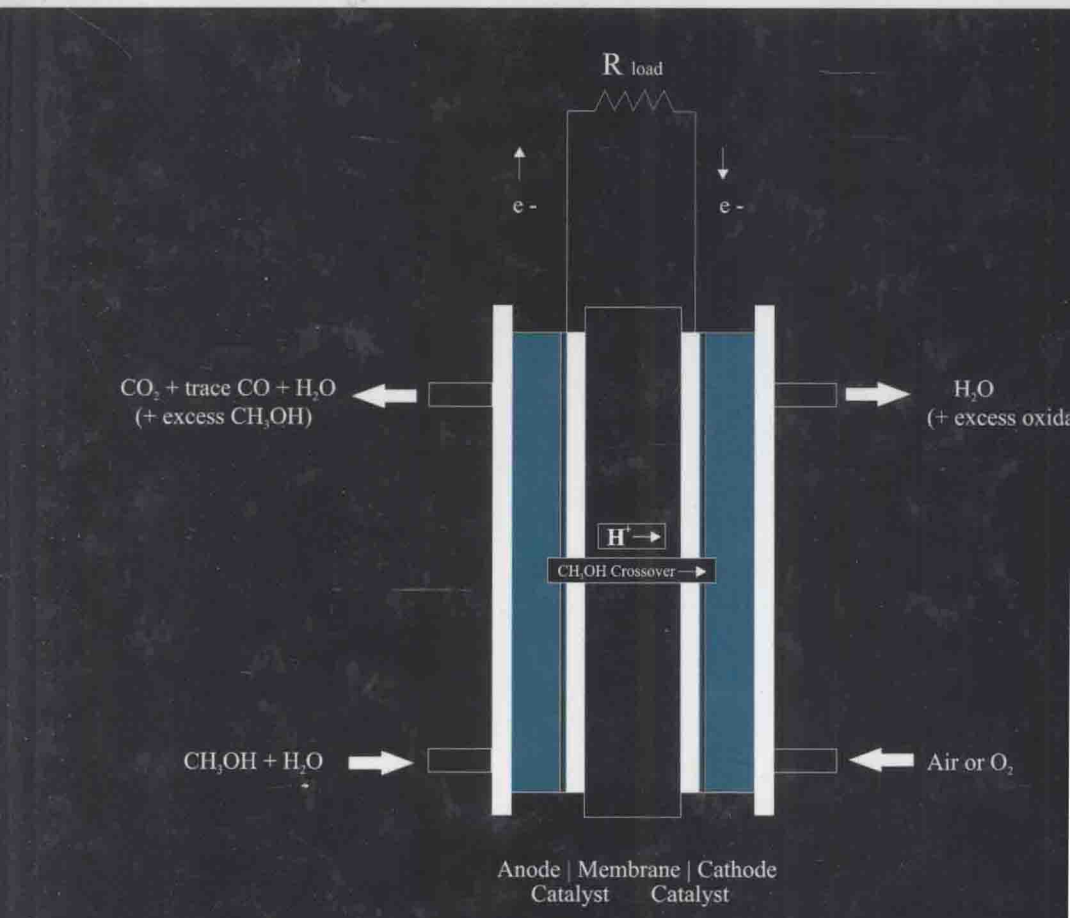
Alcoholic Fuels



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Alcoholic Fuels

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Preface

In the 1880s, Henry Ford developed a prototype automobile (the quadracycle) that could be operated with ethanol as fuel. Historians say that Ford always believed that the Model T and his future cars would use alcohol as fuel because it was a renewable energy source and would boost the agricultural economy. Over a century later, research has finally brought us to the point at which using alcohol-based fuels for transportation applications is a reality. Over the last two decades, research on alcoholic fuels as alternative and renewable energy sources has exponentially increased. Some of these alcoholic fuels (e.g., methanol and ethanol) have been introduced into the market as alcohol-gasoline blends for combustion engines, but research has also focused on employing these alcohols as fuels for alternative energy platforms, such as fuel cells. This book will provide a comprehensive text to discuss both the production of alcoholic fuels from various sources and the variety of applications of these fuels, from combustion engines to fuel cells to miniature power plants (generators) for farms.

Currently, there is no text on alcoholic fuels. The books on the market that come close are *Biomass Renewable Energy, Fuels, and Chemicals* (1998) and *Renewable Energy: Sources for Fuels and Electricity* (1992). Neither of these texts focuses on alcoholic fuels. Both books focus on the production of all renewable energy sources and have sections on the production of alcoholic fuels, but they do not include the necessary information to see the history and future of alcoholic fuels from both production and application viewpoints. This book is comprised of edited chapters from experts and innovators in the field of alcohol fuels. The book is broken down into three sections. The first section focuses on the production of methanol, ethanol, and butanol from various biomasses including corn, wood, and landfill waste. The second section focuses on blended fuels. These are the fuels that mix alcohols with existing petroleum products, such as gasoline and diesel. The final section focuses on applications of alcoholic fuels. This includes different types of fuel cells, reformers, and generators. The book concludes with a chapter on the future of alcohol-based fuels. The book is intended for anyone wanting a comprehensive understanding of alcohol fuels. Each chapter has sufficient detail and provides scientific references sufficient for researchers to get a detailed perspective on both the production of alcoholic fuels and the applications of alcoholic fuels, but the chapters themselves are comprehensive in order to provide the reader with an understanding of the history of the technology and how each application plays an important role in removing our dependency on oil and environmentally toxic power sources, such as batteries. The book is intended to be a supplementary text for graduate courses on alternative energy, power sources, or fuel cells. There are books on each of these

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Editor

Shelley Minteer received her Ph.D. in chemistry in 2000 from the University of Iowa. She has been on the faculty of the Department of Chemistry at Saint Louis University since 2000 and was promoted to the rank of associate professor in 2005. She also holds a second appointment in the Department of Biomedical Engineering. Since arriving at Saint Louis University, Dr. Minteer's research has focused on the development of efficient alternative energy sources, specifically alcohol/oxygen biofuel cells.

subjects, but no book that ties them together. To really understand alcohol-based fuel cells, you need a thorough understanding of how the alcohol is produced and purified. On the other hand, a scientist whose focus is on improving the production of ethanol needs to have a thorough understanding of how the alcohol is being used.

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