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Foreword to special issue on organometallics for energy conversion

The world is becoming increasingly dependent on new energy sources. The development and utilization of new sources of energy poses one of the greatest global challenges for humankind in the 21st century. Renewable energy sources such as solar, wind and hydroelectric power can provide large amounts of energy and could potentially solve most of our immediate energy needs. However, much research and development are needed in order to lower their costs, particularly for solar energy. Efficiency in energy conversion is one of the greatest challenges for the utilization of renewable energies. Most of these renewable energy sources provide energy in the form of electricity. Although electricity can be readily used to do work, it cannot be conveniently stored in large quantities. For this reason, hydrogen has attracted great interest. Hydrogen, per se, is not a renewable energy source because the planet earth has no appreciable naturally occurring supplies of it. However, hydrogen can be made cleanly from electricity by the electrolysis of water. Photo-splitting of water to make hydrogen and oxygen has also attracted much research interest recently. Hydrogen can be stored and its energy content can be safely utilized by using fuel cells. There is also growing interest in converting hydrogen into liquid hydrocarbons and alcohols by reactions with CO and CO_2. These liquid fuels have higher energy density than hydrogen and are more conveniently utilized by the world's current energy consuming infrastructure. Much of the world's energy is consumed by lighting needs. There is a great interest in improving the efficiency of the conversion of electricity into light. There have been major advances in the development of light-emitting devices in recent years. Today, there is much research interest in developing lower-cost organic light-emitting diodes (OLEDs). Recently, organometallic chemists have made important contributions to the topic of energy conversion. Organometallic compounds have been used in the construction of photovoltaic devices. Catalysts will be required for the safe and efficient utilization of hydrogen. Organometallic chemistry will play a central role in the creation of these new catalysts particularly for the development of low-cost nonprecious metal catalysts. Finally, organometallic compounds will be used in the creation of new and efficient OLEDs. For these reasons the coeditors, R.D. Adams, G. Kubas and W.Y. Wong, of this special issue of the Journal of Organometallic Chemistry have decided to organize this issue focused on recent research developments on the topic "Organometallics for Energy Conversion". It is hoped that new results reported herein will stimulate others to bring their expertise to this important mission to help to solve some of these great challenges.

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