
PREFACE

Energy consumption has increased in the world in recent decades, especially in the developing countries. Fossil fuels such as petroleum oil, coal and natural gas are exhaustible resources and generate large amounts of carbon dioxide and environmental pollutants promoting global warming and climate change. We are overloading our atmosphere with carbon dioxide, which traps heat and steadily drives up the planet's temperature. As a consequence of global warming, sea levels are rising, the number of large wildfires is growing and dangerous heat waves are becoming more common. Moreover, extreme storm events are increasing in many areas while severe droughts are occurring in others. This is having significant and harmful effects on our health, environment and communities. When the weather gets warmer, evaporation from both land and sea increases. This can cause drought in areas of the world where the increase is not compensated for by more precipitation. In some regions this will result in crop failure and famine, especially in areas where temperatures are already high. The extra water vapour in the atmosphere will fall again as extra rain, which can cause flooding in other places. Unless we take immediate action to address global warming, these processes will continue to intensify, become ever more costly and increasingly affect the entire planet. An overwhelming majority of climate scientists agree that global warming is primarily down to human activity. We can act now to reduce fossil fuel consumption, slow the pace of global warming, and pass on a safer, healthier world to our children. Or we can choose to do nothing, continue pumping massive amounts of carbon dioxide into an already overloaded atmosphere, and suffer the increasingly costly consequences.

Resource depletion and predictions of severe environmental effects deriving from continual use of solid fuels are spurring interest in sustainable management of energy. Therefore, our goal should be to reduce the environmental impacts by the proper utilization of resources. The only sensible solution is to use energy more efficiently in the short term and reduce our further reliance on fossil fuels. Advanced techniques are required to shift from a fossil fuel-based economy to sustainable energy management and system engineering. Recently, attention has been focused on the use of renewable biomass, which is considered one of the promising future resources for energy and materials throughout the world. The movements of wind and water, the heat and light of the sun, the carbohydrates in plants, and the warmth of the earth are energy sources that can supply our needs in a sustainable way. A variety of methods are used to convert these renewable resources into energy. Each comes with its own unique set of technologies, benefits, and challenges. Thus, we should develop efficient initiatives to convert energy and material from renewable resources.

Taking into consideration the above statements, we have carried out studies on management, treatment and recycling, efficient use of waste coal, air pollution control and conversion processes on renewable energy or biomass refining technology. The seven articles published in this issue are based on short papers presented in a special session at the 4th International Conference on Energy and Sustainability. They are entitled as follows:

1. Process analysis of the waste bamboo by using polyethylene glycol solvent liquefaction
2. Investigation of condensation reaction during phenol liquefaction of waste woody materials
3. Study on biomass tar reduction by ash and fluidizing medium in a heterogeneous reaction
4. Reactivity for pyrolysis and CO₂ gasification of alkali metal loaded waste wood char

5. Oil aggregated behavior for coal recovery and combustion characteristics of their aggregates from different grade coals
6. Recovery briquetting technologies of waste biomass and pyrolyzed waste char produced from solid industrial and agricultural organic wastes
7. Reduction of fine particles exhausted from small-size combustor using agricultural waste residue by controlling burning temperatures

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