
Title: Green Hydrogen Challenges



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Proposal

Hydrogen has been in use for many decades in sectors like the refining and chemical industries. However, its use as an energy carrier has started receiving increased interest only in recent years. Climate changes caused by greenhouse gas emission already has huge effects on quality of life. Therefore, partial replacements of fossil fuels, by renewable energy sources should be considered as the best way to decrease emitted greenhouse gases. One of the problems with renewable energy sources is the leveling of electric energy obtained by hydro, nuclear or thermo power plants. One of the best ways to convert excess electric energy is the electrolysis of water and storage of hydrogen as the energy carriers. Also, the production of green hydrogen is plausible from biomass gasification and water gas shift reaction. Still, the electrolysis of water is low energy efficient, 50-65%, and gasification produces among hydrogen, tar, ashes, and some small amounts of toxic organic chemicals. Fuel cells play also a key role in converting hydrogen potential chemical energy into the electric energy.

Hence the aim of this special issue intends to explore the international research experiences that are focusing the challenges of green hydrogen production and usage.

The themes that can be addressed in the special issue are:

- Advanced water (alkaline, polymer electrolyte, anion exchange membranes, solid oxide) electrolysis;
 - Progress in biomass gasification;
 - Hydrogen metal-hydride storage;
 - Progress in polymer electrolyte fuel cells;
 - Progress in solid oxide fuel cells operating on the product of biomass gasification.
 - Fuel cells for energy leveling
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