Chief Editor's Message

Green Hydrogen for Earth Sustainability

Prof R K Kotnala
FNASC, FIGU, FMSI
Chief Editor, Current Natural Sciences & Engineering, Journal (CNS&E)

DOI: https://doi.org/10.63015/1h-kotnala.2025.2.1

*Corresponding Author Email: rkkotnala@gmail.com

I feel thrilled to publish a special vol 2, issue 1 of CNS&E journal on Green Hydrogen for Earth Sustainability, Feb 2025, which is the need of the hour for the earth sustainability. The editorial responsibility of this issue has been entrusted to Prof K K Pant, Director IIT Roorkee, whose distinguished expertise in Green Hydrogen production and allied fields immensely benefited CNS&E Journal. Editorial team, myself and CNS&E Journal are grateful to Prof Pant for agreeing to work for such a burning issue of Green Hydrogen production challenges & constraints.

Since, we all are aware of the prevailing adverse condition of our environment and facing a grave situation of abrupt climate change & severe health issues due to unlimited carbon emissions to the atmosphere, which is not restricted to one region of earth but its impact is prevalent globally ! How to combat such a challenge within a short time ? The only immediate worldwide unanimous solution has emerged to make use of a cleanest energy source, green hydrogen, for the need of energy by replacing fossil fuels usage that can fulfil the commitment to environmental sustainability and hydrogen stands at the forefront of this transition. At present most of the hydrogen produced in the world is generally consumed by the petrochemical fertilizer and chemical processing industries. Due to the boost in the hydrogen economy, the use of Hydrogen as future fuel in the automobile sector will also stimulate the need for hydrogen. Hence, the use of hydrogen in industries, automotives etc holds immense promise as a clean, versatile fuel with zero carbon emissions. In the present scenario, the whole world is in dire need of ~300 million tonnes/year production of green hydrogen to achieve Net Zero Carbon emissions by 2035 for the earth's sustainability.

Thus, even today worldwide scientists are in pursuit of green hydrogen generation by new techniques. Although at such a crucial & crisis situation, one of the best solution for green hydrogen & electricity production is from Prof R K Kotnala & Dr Jyoti Shah's revolutionary invention of Hydroelectric Cell device, which is internationally validated through >87 original research papers & US/Indian patents in last six years. That is why, CNS&E has taken initiative to publish a special theme issue on Green Hydrogen for the Earth Sustainability!

The special theme issue consists of the following papers :

"Thermochemical Conversion of Agro -Waste for Green Hydrogen Production" manuscript elaborates different techniques for hydrogen production with a focus on a matured biomass gasification to produce hydrogen because it has the advantage of recovering energy from waste biomass. It also briefed about merits & demerits of the different techniques and current status of Hydrogen demand globally and in the perspective of Indian demand as well.

"Beyond Silos: A Unified Approach to Decarbonisation through Hydrogen Integration", the present manuscript explains critical global challenges in detail for hydrogen production capacity and comparisons by suggesting a few recommendations and the pathways for enabling a decarbonised future powered by clean, sustainable hydrogen energy.

"Green Energy Generation from the Industrial Waste Red Mud as Hydroelectric Cell", the authors in this manuscript have taken an inventive scientific novel approach that shows how huge quantities of red mud can be disposed of by converting red mud to energy material based Hydroelectric cells which is a sustainable solution to save the environment. Otherwise its improper disposal is contaminating land, water, and air which pose alarming environmental challenges.

"Trial of pilot scale nanofiltration unit for improvement of precipitation circuit at Tummalapalle Mill" A new concept of recycling a major fraction of leached uranium liquor has been adopted to increase the concentration of mother liquor from the leached slurry belt filter. A special useful effort has been made to increase the concentration of clarified mother liquor using a laboratory model of a nanofiltration unit at UCIL Tummalapalle and the reproducibility of the data has been established in this manuscript.

"Exploring the Potential of CFBC Ash in Sustainable Building Materials: A Review" This review is focused on generation of CFBC ash, characterization of CFBC ash and advancement in processing techniques with focus on current and potential applications via waste management for industrial and societal benefits particularly for use in the construction industry. Authors have taken a very important example from India being the 2nd largest ash producer in the world including petroleum coke fly ash with annual generation of 1,00,000 MT in an oil refinery located in Madhya Pradesh. It mainly emphasises on the utilization of CFBC ash as a very crucial for environmental protection and sustainable development.

"The Impact of Stress on Education: Understanding the Consequences and Finding Solutions" In CNS&E Education Watch Report, the author has described stress and education as intricately linked, with the pressure to perform well academically often taking a toll on students' mental and emotional well-being. Further, it has pointed out some of the causes of stress in education and the role of educational institutions.

Prof R K Kotnala.