

Chief Editor's Message

Editorial

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**Future Generation & Storage of Green Energy: A Big Challenge?
Hydroelectric Cells, Perovskite Solar Cells, and Supercapacitors: A Rescue for
Earth's Sustainability!**

Solar and hydroelectric cells are well-known green energy devices for generating electricity to achieve net carbon zero and Earth's sustainability. Hydroelectric cells have shown an overwhelming response by producing hydrogen through water splitting in different modes. Nevertheless, the supercapacitor's role in charge storage is also very important.

Widely recognized and validated revolutionary Hydroelectric Cell (HEC)—a paradigm-shifting green energy technology that achieves room-temperature water splitting without external energy, directly advancing the global pursuit of Net Zero Carbon and earth sustainability. It achieves room-temperature water splitting by using a nanoporous, oxygen-deficient ferrite (or metal oxide) attached to two electrodes, zinc & silver, to generate clean electricity without external energy. Hydroelectric Cell invention is embedded with fundamental challenges the traditional limits of green energy, proving that ambient moisture and advanced material physics can generate clean electricity directly.

There is an urgent demand for highly efficient energy storage devices due to steep increase in the basic requirements of energy in the day today's routine. Supercapacitor based on Zinc Oxide being a cost-effective and environmentally friendly electrode, shows a promising future in this direction. However, its practical application is hindered by prevailing low electrical conductivity, which leads to poor electrochemical performance. To increase the energy storage capacity of ZnO, a recent study published in this issue innovated a Zinc Oxide/ Carbon Black (Zn/CB) nanocomposite electrode. The Zn/CB nanocomposite electrode exhibited a

remarkable increase in specific capacitance compared to the pristine ZnO. It increased from 128 F/g (ZnO) to 375 F /g (Zn/CB) at a 10 mV/s scan rate. Moreover, the composite displays exceptional cyclic stability, showing 145% capacitance retention of 145% and coulombic retention of 94% after 3000 cycles @ 15 A/g. These interesting results demonstrate that integrating carbon black with zinc oxide substantially enhances its electrochemical performance, positioning the ZnO/CB nanocomposite electrode as a cost-effective, high-performance, nature-friendly electrode for future energy storage systems.

The breakthrough of utilizing water's spontaneous chemisorption followed by physisorption on nano-porous metal oxide surfaces—while simultaneously synthesizing highly valuable biocompatible nanoproducts (nano-zinc hydroxide and hydrogen)—is a masterclass in elegant circular engineering. It is a massive contribution to the scientific community and a vital blueprint for India's sustainable future.

The Current Natural Sciences & Engineering Journal (CNS&E) moved forward with high expectations to facilitate novel ideas and technologies from the scientific community, aiming to provide people with a more comfortable and healthy life. To promote the welfare of Earth's sustainability and nature for sustainable life in a clean environment, the journal is facilitating the quick publication of new ideas and science-based manuscripts. In this direction, the CNS&E journal is a big platform to disseminate researchers' new approaches to ideas/innovations at a global level in a short time.

With a unique objective, the CNS&E journal aims to inspire future directions in interdisciplinary science research, with the sole purpose of creating impactful science & engineering knowledge and breakthrough innovation for the betterment of the world. Our passionate scientific teams of editors and reviewers have a solemn resolution to conform to fundamental principles of research objectivity, integrity, and ethical norms to promote knowledge generation and publication, in a more transparent and credible way, through far-reaching impacts on holistic scientific development. The CNS&E journal has already strived for global visibility during the last two years and engaged the scientific community worldwide for better dissemination of knowledge with a truly new science promotion.