Short Article

Journal of Materials Engineering and Applications

Smart Material 2021: The Smart Energy Material Oxygen Deficient Nano-porous Li-Magnesium Ferrite based Hydroelectric Cell: A Biggest Invention of the 21st Century on Green Electricity as an Alternative to Replace Solar Cell & Fuel Cell! - R K Kotnala, India

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Abstract

Invention of green energy device Hydroelectric Cell,HEC, is an alternative to Solar cell & Fuel Cell for Masses. HEC represents the most versatile green energy solution ever invented from India. It is an exceptional advancement in the development of green energy device and it has opened a new area of research.The impact of the HEC invention on social media has been appraised by >1 million & 90 thousand viewers on YouTube uploaded by different media channels. A smart energy material Li-substituted magnesium ferrite has been engineered and processed in such a way to create deliberately oxygen deficiency and nano-porosity to dissociate spontaneously water molecules into hydrogen & hydroxide ions in the ferrite at room temperature. The ions generated are separated and collected, by two electrodes zinc and silver attached onto the surface of the ferrite to obtain green electricity.In this process no acid/alkali/electrolyte/light is required except water! One of the key strategies to boost their properties to generate more electricity involves doping of different elements for energy generation that is being innovated by Dr Kotnala group & other associates. The splitting/dissociation of water molecules into ions at room temperature without using any external energy is one of the best options, eco-friendly and pollution free green energy device invention of the 21stcentury. Sprinkling of few drops of water on HEC generates electricity spontaneously without the use of any acid/alkali/light on it.The Hydroelectric cell working principle is the combination of material science, Nanoscience and electrochemistry. The Nanoporous oxygen deficient ferrite/ metal oxide materials used in hydroelectric cell dissociates water molecule into hydrogen and hydroxide ions at room temperature without any external energy. Nanoparticles of zinc hydroxide and hydrogen gas by-products are formed at the electrodes of the cell. The by-products of HEC are also very useful and non toxic.Hydroelectric cell (HEC) technology offers safe, clean, low cost and reliable power generation almost any electrical device. Hydroelectric Cell based on ferrite/SnO2/TiO2 can be used in a wide range of portable, stationary and transport applications, from battery chargers to low power devices. The utilization of the Hydroelectric Cell domestic electrical energy needs and as an automotive power source would be a key factor in terms of economy, safety and easy usage to replace hydrogen energy based fuel cell, storage batteries etc. Its usage would significantly reduce urban pollution. In all of these applications, there is a need for reduced system cost, high reliability and acceptable performance. While the performance of the prototype developed system has made the remarkable strides, there is still much work to be done for its large scale application and durability. HEC represents the most versatile green energy solution ever invented. Dr. R. K. Kotnala & Dr. Jyoti Shah has invented & developed a new electrical energy source using porous magnesium ferrite pellet based Hydroelectric Cell. A one inch square cell develops a maximum Voltage 0.98 V & a short circuit current of 108 mA.The Results are highly comparable to solar cell and other portable electrical energy sources that too without the use of any electrolyte except water.Hydroelectric Cell is proving superior over solar cell & fuel cell application in a much better way.

Biography

Dr. RK Kotnala is currently Chief Scientist and Head of Environmental Sciences & Biomedical Metrology Division. He has an experience of 35 years as a Scientist in National Lab., After completing his masters in Physics did Ph.D from IIT Delhi in 1982. He has acquired diversified experience as distinguished Metrologist, Physicist, Nanoscience, Environmental Sciences & Materials Scientist having strong interaction with 112 industries based on ISO:17025. To his credit more than 365 published papers in SCI Journals. Dr Kotnala & Dr Jyoti Shah have invented a revolutionary green energy device - Hydroelectric Cell in 2015 which is a boon for masses.

Bottom Note: *This work is partly presented at 2nd World Congress on Smart Material and Material Science at July21-22, 2021 | Webinar*

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Received: July 21, 2021, Accepted: August 27, 2021, Published: December 02, 2021,