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*Conference Abstract*

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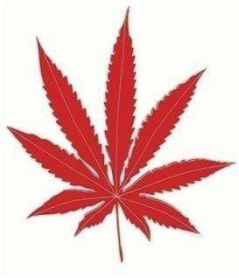
Saturday, December 31, 2022 11:00 AM to 1:10 PM
Mississauga ON Canada.



The phenomenal speaker present this research in 9st International The Holy Quran & Science Conference and Exhibition-2022, held in Mississauga ON Canada. The Conference Abstract is published on behalf of the decision of accepting and approval of Conference Organizing Committee.

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***Conference Abstract***

## OPTIMIZED COMPOSITE MICROELECTRODES FOR IN-PLAN MICRO – SUPERCAPACITOR

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**Abstract**

"And do not desire corruption in the land. Indeed, God does not like corruptors." (Qur'an 28:77). In recent years, challenges associated with climate change, energy, and continuous oil crises due to decreased availability of fossil fuels have motivated a growing interest towards progress in clean, renewable, and sustainable energy resources. Therefore, we testimony an increase in energy generation from the wind, sun, biomass, and hydro resources with low carbon emissions. However, the energy from these resources needs to be stored in appropriate, reliable, and environmentally benign ways for continuous and sustainable supply at times of demand. Energy storage devices have become an enabling technology for dispatching and better utilization of energy from these intermittent sources. The energy storage field is attracting attention from industrial and scientific communities to develop expertise in clean and renewable energy storage systems. Corresponding to their utilization in electric vehicles, wireless home appliances, and communication devices of power requirement, the research in developing advanced storage devices finds an enormous and vast future ahead. With the emerging trend and advancement of miniaturized portable electronics, there is an increasing demand for high performance micro-scale energy storage systems with high reliability. In this regard, planar micro-supercapacitors (MSCs) are beneficial power sources due to their small size, excellent rate performance and long cycling life. Herein, we demonstrate the fabrication of a planar MSC with stacked MnO2/PPy microelectrodes through facile electrodeposition and study its electrochemical performance. A layer of PPy was electrochemically deposited on Au current collectors followed by electrodeposition of urchin-like MnO2 micro/nanostructures. We employed electrodeposition method to tailor the thickness and morphology of MnO2 decorated PPy microelectrodes by optimizing the parameters such as current density, potential and deposition time. The electrochemical performance

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**Competing Interest**
The authors declare no competing interests.

Additional information is available at the end of the article.

of MnO2/PPy-MSC was evaluated by using LiClO4/PVA gel electrolyte. Our approach provides distinct pathways for access of electrolyte and maximum charge transfer through microelectrodes, while preventing the aggregation of MnO2. The fabricated MSC exhibits an improved specific capacitance and energy density by the virtue of highly conductive PPy and high capacitive property of MnO2. A layer of PPy strengthens the conductivity of microelectrodes by fast electron transfer and ensures the high utilization of active material. While, MnO2 micro/nanostructures have more active sites which facilitate the fast ion diffusion and exchange at electrode-electrolyte interface, providing high capacitance. Our proposed strategy provides a versatile and promising method for large-scale fabrication of high-performance MSCs.

**Ethics approval and consent to participate**: No ethical approval needed for this research work.

**Consent for publication**: Author is agreed to submit this abstract for publication in this research journal.

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**Declaration:** The abstract is reviewed and accepted by the Conference Organization Committee of 9th The Holy Quran & Science Conference; 2022. The presenter was permitted to share his research after final approval of the committee. The scientific research information was presented at aforesaid event held virtually on December 31, 2022 in Canada. Hence, the journal is publishing this abstract on behalf of the Conference Organization Committee.