

FLOW VISUALIZATION OF A DIELECTRIC BARRIER DISCHARGE PLASMA ACTUATOR

Author(s): **Andrew Ragai Henry Rigit¹, Abdul Qayoom Jakhrani², Ijen Dakek³, Ahsanullah Soomro⁴**

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Abstract:

The optimum operating conditions of dielectric barrier discharge (DBD) plasma actuators were determined using both the quantitative and qualitative methods. The quantitative study was carried out by estimating DBD discharge power using the theoretical and experimental methods. The theoretical analysis was carried out to find a mathematical model, which describe the discharge power of the DBD actuator. The estimated results from the mathematical model were compared with the experimental values obtained from Lissajous figures. The qualitative analysis was used for the plasma flow visualization. The effects of the DBD design parameters were studied through the images captured using a high speed charge-coupled device camera. Simulation work was done in order to obtain an insight of the electric field responsible for the plasma formation using the commercial computer software. The results revealed that the performance of the DBD plasma actuator was influenced by various design parameters, especially by dielectric thickness and controlled by the input voltage characteristics.



¹ Professor, Department of Mechanical and Manufacturing Engineering, Faculty of Engineering, Universiti Malaysia Sarawak (UNIMAS), Sarawak, Malaysia, Ph. +60-82-583292, Fax: +60-82-583410, Email: arigit@feng.unimas.my.

² Assistant Professor, Department of Energy and Environment Engineering, Quaid-e-Awam University of Engineering, Science and Technology, Nawabshah, Pakistan, Ph. +92-244-9370362, Fax: +92-244-9370367, Email: aqunimas@hotmail.com.

³ Postgraduate Student, Department of Mechanical and Manufacturing Engineering, Faculty of Engineering, Universiti Malaysia Sarawak (UNIMAS), Sarawak, Malaysia, Fax: +60-82-583410, Email: ijendakek@yahoo.com.

⁴ Lecturer, Department of Energy and Environment Engineering, Quaid-e-Awam University of Engineering, Science and Technology, Nawabshah, Pakistan, Ph. +92-244-9370362, Fax: +92-244-9370367, Email: ahsan.ee@quest.edu.pk.

For full paper, contact:

Prof Muhammad Masood Rafi

Editor-in-Chief, NED University Journal of Research

Ph: +92 (21) 99261261-8 Ext:2413; Fax: +92 (21) 99261255

Email: NED-Journal@neduet.edu.pk

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