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Design and Construction of a Portable Plasma Jet Laboratory Set for Medical Applications

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ABSTRACT

Introduction: This research examines the design and construction of a cold atmospheric pressure plasma jet laboratory set. Its advantages include small size, portability, ease of use, suitable economical cost, high-speed response, and a narrow nozzle, such that its flow allows the plasma to access the entire cavity space. The laboratory set consists of four parts: a power supply, a gas capsule, a plasma jet nozzle, and gas flow measurement connections. One of the challenges of using a plasma jet in the medical field is the ability to provide a suitable and sterile space for processing with plasma, as well as safety limitations of working with high voltage. In this proposed design, an attempt has been made to eliminate these short comings

Materials and Methods: The plasma jet laboratory set consists of four parts: an adjustable power supply, a gas capsule, a plasma jet nozzle, and gas flow measurement connections.

Results and Discussion: Among the advantages of the plasma jet laboratory set are its small size, portability, ease of use, suitable economical cost, high-speed response, and narrow nozzle.

Conclusion: Features of the proposed laboratory set include the use of refractory insulation in the body of the jet. This insulation model provides better containment, preventing plasma formation in the body and consequently significantly reducing energy loss. The presence of proper insulation inside the jet body also helps prevent unpredictable arcs. In the designed jet structure, plasma is formed precisely at the jet tip, which is exposed to air, leading to an increased concentration of NO in that area. Other advantages include its small size, ease of use, suitable economical cost, high speed, and narrow nozzle.



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Keywords: Laboratory set, Medical equipment, Plasma jet

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