

## **ABSTRACT**

*This research is to know the influence of plasma irradiation of dielectric discharge in a fabric sample of polyester weight reduce with variation of electrode distance and irradiated duration variations. Research is conducted on atmospheric pressure with a multi-point configuration field. The characterization of the current-voltage relationship, the plasma reactor raised through the electrodes with the glass and the air of the AC high voltage source, is performed by varying the distance between the electrodes. In addition, the characterization of the discharge is also done by placing samples in the discharge area. Then carried out the reintegration of the fabric samples polyester weight reduce with variation between the electrode distance and the duration of plasma irradiation to the sample. An irradiated sample, carried out test absorbent tests, mechanical tests (break test) and SEM test to determine the influence of radiation. The result of current-voltage characterization indicates, on non-samples having optimal plasma work at distances of 0.6 to 2.1 cm, it is affected by the presence of resistivity with a larger sample than air. Comparative results of the mobility of sample ions and non-samples, obtained using the Robinson equation, indicating the value of ion mobility with the sample has greater results with a minimum value of  $0.0159 \times 10^{-6} \text{ cm}^2/\text{V} \cdot \text{s}$  and maximum value of  $1.466 \times 10^{-6} \text{ cm}^2/\text{V} \cdot \text{s}$ . It is influenced by resistivity with a lower sample than air. On the results of drip test, indicating plasma reactor works effectively in cloth irradiation at the electrode distance of 0.6 cm with a length of 35 minutes, has the highest wet level of cloth. The results of the SEM test show the sample of the fabric with the treatment of plasma irradiation, indicating a change in the morphology of fiber fabric in the form of rough structures, enlarged pores, blisters, and shrinkage. The result of mechanical test value (break test), showing the fabric samples after being given the plasma irradiation has the maximum value of the pressure of the break test of 985.0 kPa at an electrode distance of 0.6 cm with a length irradiation of 15 minutes.*

**Keywords:** *plasma dielectric discharge, polyester weight reduce, multi point areas, levels of wetness, the morphology of fiber fabric*