CHAPTER V
CONCLUSIONS

This work showed that the electrode gap distance of DBD plasma reactor exerted significant effects on the surface properties of woven PET. Increasing the treatment time of the plasma exposure resulted in a higher hydrophilic character of the woven PET, but after a certain treatment time, saturation level of the hydrophilicity was reached. It was also shown that an increasing voltage resulted in a higher hydrophilic character. This was not only caused by the presence of more active species at higher power, but also by the behavior of the barrier discharge itself. Normally, the current and power decreased with increasing frequency. The number of inelastic collisions between gas molecules and high energy electrons decreases since a decrease in the number of generated electrons is always accompanied by decreasing the amount of current. Therefore, the hydrophillicity of woven PET slightly decreased with increasing frequency. The differences in chemical and physical modifications of woven PET after plasma treatment under medium (0.15 bar) and atmospheric pressures were studied. It was shown that plasma treatment led to a significant increase in wettability under both medium (0.15 bar) and atmospheric pressures and that the surface modification was quite homogeneous. The increase in the hydrophilicity of the woven PET after plasma treatment was caused by the creation of oxygen-containing polar groups (O–C=O and C–O groups) on the surface, as shown by the results of XPS analysis. Silver nanoparticles could be successfully coated on plasma-treated woven PET surface by submerging into silver nitrate solution. The silver nanoparticles-coated woven PET exhibited a strong antimicrobial activity against both *S. aureus* (gram-positive bacteria) and *E. coli* (gram-negative bacteria).