# CHAPTER V
# CONCLUSIONS AND RECOMMENDATIONS

## 5.1 Conclusions

Under the studied conditions with and without photocatalyst, benzene was almost completely removed by the corona discharge. The benzene decomposition efficiency decreased with increasing frequency. Since at a higher frequency, current is lowered leading to the reduction of the number of electrons generated. A higher applied voltage increased the benzene conversions as well as $CO_2$ selectivity since current is increased with increasing applied voltage. A higher feed flow rate decreased both benzene conversion and $CO_2$ selectivity because of decreasing residence time. The presence of the catalyst coated on glass wool increases both benzene conversion and $CO_2$ selectivity because the energy produced from the plasma generation activates $TiO_2$ to promote oxidation reaction, accelerates the formation of superoxide radical anion, $O_2^{\bullet -}$, and decreases the recombination process.

## 5.2 Recommendations

In order to further understand the corona discharge-initiated reactions, plasma characterization is indispensable. Pure oxygen should be used instead of air in order to study the kinetics reaction or kinetic analysis of benzene oxidation. Other VOCs should be investigated using the present plasma system with and without catalyst. Other types of catalysts and supports are also of interest to study for this application and the catalyst loading should be studied and developed as well.