CHAPTER V
CONCLUSIONS AND RECOMENDIONS

5.1 Conclusions

The phenomena of water droplet impact and rebound on to the super-hydrophobic surface of plasma-treated polypropylene film coated on a glass surface were investigated by using the high-speed solid state CCD camera. The water droplet with high hydrophilicity was found to rebound onto the plasma-treated polypropylene film coated on a glass surface. This experiment was to study, the effects of droplet size, and initial impact velocity. From the results of this study, it can be concluded that:

1. The movement of center of mass showed that for any water droplet rebound, there were two peaks of maxima unlike a solid particle free falling body because of the internal movement of the water droplet.
2. During the rebound process, the image results showed the vibration both in the horizontal and vertical directions but it was greater in the vertical direction due to the effect of gravity force.
3. The larger the water droplet size, the smaller the number of droplet.
4. The larger the water droplet size, the greater the energy loss during the impact process.
5. The effect of initial impact velocity is verified in terms of energy loss. The greater the initial impact velocity, the greater the energy loss. The water droplet of 10.9691 mm^3 with initial impact velocity of 0.4344 m/s had the ratio of energy loss of 0.5830 during the 1^{st} impact whereas the droplet with initial impact velocity of 0.6476 m/s had the ratio of energy loss of 0.7435.
6. The greatest initial impact velocity of 0.6476 m/s was found to yield a secondary droplet during the 1^{st} impact process with 0.4% of total volume.
7. The greater the spreading and receding velocity, the higher the possibility of the secondary droplet come off during the 1^{st} impact process.

5.2 Recommendation

The study of liquid droplet onto a super-hydrophobic surface should be conducted using a better system that can minimize external effects such as wind and light. Other liquids that have different hydrophilicity property should be studied in the future work as well as the effect of surfactant on the rebounding phenomena should be investigated.