CHAPTER VI

CONCLUSIONS

Gamma radiation of polypropylene wood composites was provided to be a potential alternative for improving only its creep problems. The results showed that the environment condition for irradiation of the wood composites had slight effect on improving their mechanical properties such as modulus, strength, and creep behavior.

The radiation dose suitable for improving the mechanical properties, such as modulus, strength, and creep resistant, of composites was about 10 kGy. The polypropylene, wood and composites radiated with gamma ray at 10 kGy rendered about 23% increase in flexural modulus compared with the unirradiated samples. The strength of the irradiated polypropylene was higher than that of the unirradiated polypropylene. In addition, gamma radiation can lead to enhance interaction between polypropylene matrix and woodflour. The significant decrease in the mechanical properties of the polypropylene wood composites beyond 10 kGy of the applied gamma radiation was found to be mainly caused by the degradation of the woodflour filler.

The addition of compatibilizer, PP-g-MA, was able to increase the modulus, strength, and reduce the creep strain. Moreover, we observed that the effect of PP-g-MA combined with gamma radiation can reduce creep value for approximately 36%.

Finally, the suitable condition for improve the mechanical, thermal, and morphological properties of polypropylene woodflour composites was obtain when a radiation dose at 10 kGy with a dose rate of 0.2112 kGy/min under nitrogen atmosphere was used.