Thanathon Sukmala 2009: Thermogravimetric Study of Polypropylene and Polypropylene/$CaCO_3$. Master of Science (Physics), Major Field: Physics, Department of Physics. Thesis Advisor: Associate Professor Supreya Trivijitkasem, Dr.Ing. 97 pages.

The nonisothermal decomposition process of polypropylene / $CaCO_3$ composites were investigated by thermogravimetric analysis (TGA). Five composition were used: 100:0, 92:8, 90:10, 85:15 and 80:20. The kinetic parameters E, $\ln A$ and n were determined from model – fitting method : the Modified Freeman and Carroll (FC) using the TG and DTG data. A single set of the kinetic triplet was obtained. The activation energy of PP/$CaCO_3$ was increased as the increasing of rate of heating, and at a given rate of heating, the activation energy of PP/$CaCO_3$ was decreased as the increasing of $CaCO_3$ content.

The dependence of apparent activation energy E_α and logarithm pre-exponent factor $\ln A_\alpha$ on the degree of conversion α were determined using isoconversion model-free method. The Kissinger-Akahira-Sunose (KAS), the Flynn-Wall-Ozawa (FWO) and the Friedman (FR) models were applied. The appropriate integral conversion function $g(\alpha) = [-\ln(1-\alpha)]^{1/2}$ of the process was selected by means of the model-fitting master-plot method. The dependence of apparent activation energy E_α and logarithm pre-exponent factor $\ln A_\alpha$ on the degree of conversion α determined from KAS method were lower than FWO method and FR method. The apparent activation energy E_α and logarithm pre-exponent factor $\ln A_\alpha$ was average from α = 0.1 – 0.7, the results showed that the apparent activation energy E_α decreased as the increase of $CaCO_3$ content. Adding $CaCO_3$ in polypropylene results in a easier decomposition process.

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