Piriya Pinthong 2009: Co-pyrolysis of Rice Husk, Polyethylene and Polypropylene Mixtures: A Kinetic Study. Master of Engineering (Chemical Engineering), Major Field: Chemical Engineering, Department of Chemical Engineering. Thesis Advisor: Associate Professor Apinya Duangchan, Ph.D. 82 pages.

Co-pyrolysis behavior of rice husk, waste plastics and their blends was studied by thermogravimetric analyzer (TGA). The data obtained from TGA can describe the decomposition behavior of materials and synergistic effect. They can also be used to determine the kinetic parameters (activation energy and pre-exponential factor).

The activation energy (E) and pre-exponential factor (A) of waste plastics (HDPE, LDPE and PP) decomposition were in ranges of 279.0-455.1 kJ/mol and 4.95×10^{19}-1.48×10^{31} min^{-1}, respectively. The activation energy of plastic decomposition reaction reduced when plasics were mixed with rice husk. The activation energy of the mixture was in range of 221.2-317.3 kJ/mol while the pre-exponential factor (A) was in range of 2.11×10^{15}-7.18×10^{21} min^{-1}.

Waste plastics (WPL) and their blends with rice husk (RH) at different WPL/RH ratios of 30/70, 50/50 and 70/30 had synergy at 485^{o}C about 23%, 10.97%, 9.18% and 7.15%, respectively. The WPL/RH mixture of 30/70 showed the highest synergy in conversion (1.46%). Main product from pyrolysis at 485^{o}C of all mixtures was wax. The WPL/RH mixture of 30/70 which provided the highest synergy in conversion was chosen to be pyrolyzed with H-ZSM-5 catalyst. Liquid product from the catalytic pyrolysis contained almost no wax had higher heating value than the wax product (46.31 MJ/kg > 44.74 MJ/kg). The liquid product was distilled and yielded gasoline 54.54%, kerosene 24.24%, diesel 15.15% and residue 16.06% by volume.

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