

Co-Liquefaction of Cellulosic Biomass and Waste Plastics

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Abstract : A conversion technology of cellulosic biomass and waste plastics to liquid fuel at low pressure and low temperature has been investigated. This study aims at the production of the liquefied fuel (CPLF) of substituting diesel oil by mixing cellulosic biomass and waste plastics in the presence of solvent. Co-liquefaction of cellulosic biomass (Japan cedar) and polypropylene (PP) using wood tar or mineral oil as solvent at 673K with an autoclave was carried out. It was confirmed that the co-liquefaction gave CPLF in a high yield among the cases of wood or of polypropylene. This was ascribed to the acceleration of decomposition of plastics by radicals derived from the decomposition of wood. The co-liquefaction was also conducted by a small twin screw extruder. It was found that CPLF was obtained in the co-liquefaction, and the acceleration of decomposition of plastics in the presence of cellulosic biomass. The engine test of CPLF showed that the engine performances, Compression ignition and combustion characteristics were almost similar to those of diesel fuel at any mixing ratio of CPLF and any load. Therefore, CPLF could be practically used as alternative fuel for diesel engines.

Keywords : Cellulosic Biomass, Co-liquefaction, Solvent, Waste Plastics

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