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Catalytic pyrolysis of black-liquor lignin by co-feeding with different plastics in a fluidized bed reactor

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Abstract

Catalytic co-pyrolysis of black-liquor lignin and waste plastics (polyethylene, PE; polypropylene PP; polystyrene, PS) was conducted in a fluidized bed. The effects of temperature, plastic to lignin ratio, catalyst and plastic types on product distributions were studied. Both aromatic and olefin yields increased with increasing PE proportion. Petrochemical yield of co-pyrolysis of PE and lignin was LOSA-1 > spent FCC > Gamma-Al_2O_3 > sand. The petrochemical yield with LOSA-1 is 43.9% which is more than two times of that without catalyst. The feedstock for co-pyrolysis with lignin is polystyrene > polyethylene > polypropylene. Catalytic co-pyrolysis of black-liquor lignin with PS produced the maximum aromatic yield (55.3%), while co-pyrolysis with PE produced the maximum olefin yield (13%).

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