

The evaluation of material properties of modified non-coking coal for coking process

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Upgraded non-coking coal using waste plastics were studied to investigate the effect on coke strength. The most common five different types of plastic wastes (HDPE, LDPE, PP, PS, PET) were used to modify three low rank non-coking coals at elevated temperature and pressures. The non-coking coals cannot be used for coking process without pre-treatment. It is proposed that the properties of plastics can successfully alter the coal caking properties at low temperature with mild pressure. The modified coal samples were conducted TGA, XRD, FT-IR analysis to elucidate the effect of each plastic on coal characteristics. TGA results indicated the synergetic reaction effect on coal and plastics reaction especially on PET due to the high contents of Oxygen, whereas PP and PS indicated the asynergy effects. The results of XRD and FT-IR indicated the PE(HDPE, LDPE) modified coal may have influence the thermal characteristics of coal samples. Coking tests were conducted with addition of modified coal with lab scale test oven. Coking test result showed significant increase in drum index at all samples excluding the blending of coal A with PP and PET.