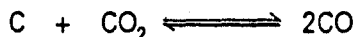


KEYWORD : CATALYSED GASIFICATION / ALKALI CARBONATE /COAL CHAR /DEMINERALIZED  
COAL CHAR SOMPORN BUNLUESRIRUANG : ALKALI CARBONATE CATALYSED  
GASIFICATION OF DEMINERALIZED COAL CHARs. THESIS ADVISOR : ASSO. PROF.  
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In this study, two alkali carbonates were used as catalysts for CO<sub>2</sub> gasification of coal chars in a thermogravimetric analyser. Catalytic activities were studied in terms of rate and activation energy, to determine significant variables that influence rates of gasification and gas production. Three samples of coals with different ash contents of 8.02, 18.57 and 41.89 % by weight respectively were used namely, Bang-poo-dum110, Mae-moh and Bang-poo-dum163. Coal samples were demineralized by hydrochloric acid and pyrolysed at 900 degree celcius to minimize effects from mineral and volatile matters. Potassium carbonate and sodium carbonate were added to coal chars by vacuum impregnation from 5, 10 to 20% by weight of char. Samples (40± 0.5 mg) were gasified at 600, 700, 800 and 850 degree celcius, employing coal sizes smaller than 75 micron. Gasification rates were followed by thermograms obtained from TGA and from GC analysis of gas samples collected for 1 minute at 5 mitute intervals for 30 minutes. The only reaction during gasification was



The result is as follows: chars without catalysts gasified at low rate at temperature greater than 700 degree celcius; their rates increased with temperature, in the range of  $0.24 \times 10^{-3}$  -  $11.79 \times 10^{-3}$  mg.mg C<sup>-1</sup>.min<sup>-1</sup>. Their activated energies were in the range of 98.84-110.78 kJ/mol. Chars with catalysts gasified at a much higher rate , 9-50 times more than that of uncatalysed sample; their rates increased linearly with amount of catalysts and temperature. K<sub>2</sub>CO<sub>3</sub> was more effective than Na<sub>2</sub>CO<sub>3</sub>. The presence of silica in coal samples asserted a negative influence on gasification. Demineralization had a positive effect on high ash char (BP163), but showed negative effect on low ash chars (MM and BP110). Addition of catalysts did not lower the activation energies, and it was found that there were catalyst lost due to its volatility during gasification.