

GASIFICATION AT VERY HIGH HEATING RATES. C. W. von Rosenberg, Jr., D. B. Northam
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Large yields of volatile matter and high throughput for gasifiers are two notable benefits of subjecting well-dispersed aerosols of pulverized coal to large rates of heating ($>10^5$ K/sec) to high temperatures ($>1500^\circ$ K). This central theme forms the basis of several investigations at AERL which seek to explore this frontier, understand the basic processes involved and apply this approach to gasifier development. Recent experimental data from our "controlled explosive gasification" program are given and related to prior work on rapid heating entrained bed reactors and to our concurrent "shock heating studies." In a single pulse/batch process reactor of 12 litre volume we dispersively premix -200 mesh HVA bituminous coal in suitable mixtures of H_2 -CO- O_2 . Ignition leads to explosive combustion of the gas mixture which provides a background of hot H_2O , CO_2 and attendant radicals which then heat the coal, stabilize the evolved volatiles, and react with the nascent char. Large yields of stabilized volatiles at high solids mass loading have been achieved. Proposed gasification processes based on this approach will be discussed.