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NO formation and reduction during pulverized char combustion in the temperature range 850–1150 °C have been investigated in fixed-bed combustion experiments. Chars from a high-volatile bituminous coal and an anthracite have been used. Under single-particle conditions the selectivity for NO formation from combustion of char from both fuel types lies in the range 65–100%. The NO formation selectivity under single-particle conditions was observed to be lowest at 850 °C, to have values close to 100% at 1050 and 1150 °C, and to be independent of O2 concentration. When conditions deviate from single-particle conditions, net NO formation is significantly lower due to NO reduction taking place simultaneously with NO formation. Rate expressions for NO reduction on char both in the presence and in the absence of O2 have been determined. For bituminous coal char, these rates are 10–100 times more rapid than values previously reported in literature, but are consistent with reburn-type experiments employing char as fuel. This discrepancy is mainly attributed to rapid char deactivation prior to measuring of NO reduction rates in previous determinations.

Shortly after pyrolysis, the effective NO-char reaction rate for pulverized bituminous coal char in the temperature range 850–1150 °C has been found to be given by

\[
r_{\text{NO}} = 6 \times 10^6 \text{m}^3 \text{kg} \text{C} \cdot \text{s} \cdot \text{e}^{14800/T(\text{K})} \cdot [\text{charC}] \cdot [\text{NO}] 
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General information
Publication status: Published
Organisations: CHEC Research Centre, Department of Chemical and Biochemical Engineering
Pages: 2271-2278
Publication date: 2001
Peer-reviewed: Yes

Publication information
Journal: Proceedings of the Combustion Institute
Volume: 28
Issue number: 2
ISSN (Print): 1540-7489
Ratings:
Scopus rating (2001): SJR 0.451 SNIP 1.526
Web of Science (2001): Indexed yes
Original language: English
DOIs: 10.1016/S0082-0784(00)80637-2
Source: orbit
Source ID: 51693
Research output: Contribution to journal › Journal article – Annual report year: 2001 › Research › peer-review