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## Study on the Reaction of Oxygen and Nitrogen under the Effect of Intense Pulsed Arc in Air

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In order to study the nitrogen-oxygen reaction caused by intense pulse arc, in this paper, the average temperature and the radius of arc channel are calculated by the method of subsection exponential fitting in Elenbaas-Heller arc model, which is related to the arc current. The calculated result shows that when the arc current exceeds 30 kA, the arc channel average temperature is saturated near 40000 K. The calculated arc radius is related to the peak and gradient of the current, as the arc radius increases, the volume of the arc channel expands, which will heat more reaction gas. The variable of peak current range from 150 kA to 300 kA and the other variable of pulse width between 1 ms and 3 ms are investigated by two experiments respectively, and the molar quantity of nitride is measured in the 4 L seal cavity with 2.3 atm dry air by flue gas analyzer. The experiment results show that when the current pulse width keeps 700 µs and the discharge peak current exceeds 240 kA, the concentration of nitrogen dioxide contents stable near 565 ppm and the concentration of nitric oxide increases progressively. According to the nitrogen-oxygen reaction principle, under the experiment parameter, the amount of nitride increases with the augment of the calculated arc radius.

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