

### 论文摘要

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## 氧化铝碳热还原反应机制及其热力学

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**摘要:** 研究了球磨活化后氧化铝碳热还原反应合成氮化铝的机理, 提出了通过氧化铝碳热还原反应合成氮化铝的新机制: 氧化铝首先发生氮化反应生成AlON相, AlON再还原氮化生成氮化铝。通过热力学计算得到的反应平衡温度与实验得到的氮化铝开始生成温度相吻合。

**关键字:** 氧化铝; 碳热还原反应; 氮化铝

## Mechanism and thermodynamics of carbothermal reduction of alumina

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**Abstract:** The aluminum nitride synthesized by mechano-chemical activation from carbothermal reduction(CTR) of alumina was investigated. Based on the experimental results, a new mechanism of CTR was proposed that AlON phase is formed at the early stage by the nitridation of  $Al_2O_3$ , and the conversion of AlON to AlN proceeds stepwise, via the CTR of AlON. The equilibrium temperature of CTR calculated from thermodynamics approached to the AlN formation temperature from experimental results, which can explain the AlN formation temperature decreases in the mechano-chemical activation synthesis.

**Key words:** alumina; carbothermal reduction; aluminum nitride

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