

煤炭解耦燃烧过程N迁移与转化 I :热解阶段煤N的释放规律

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Nitrogen transformation during coal decoupling combustion I : release behavior of coal-nitrogen during pyrolysis stage

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摘要 在固定床装置上进行了三种煤的热解实验,考察了热解温度、热解时间等因素对煤氮迁移转化的影响。热解实验表明,A煤1 073 K热解产生HCN,在热解前3 min释放完毕,早于NH₃释放,且当NH₃开始逸出后HCN生成量急剧减少;三种煤热解HCN、NH₃的累积释放量在不同时刻达到各自最大值后急剧下降;半焦氮随热解温度的升高而增加。在973~1 123 K三种煤热解有50%~60%煤氮转化为焦氮,40%~50%煤氮随挥发分一起释放,挥发分氮有20%~50%的氮物种以NH₃和HCN的形式存在,其中,HCN占气相氮的50%~60%、NH₃占40%~50%。

关键词: 煤 解耦燃烧 热解 NH₃ HCN

Abstract: Effect of temperature and residence time on coal-nitrogen transformation during pyrolysis of 3 coals from west China was studied in a fixed bed reactor. The results show that the duration time of HCN releasing is about 3 min at 1 073 K for pyrolysis of coal A. The start release time of HCN is earlier than that of NH₃, and the released amount of HCN quickly drops to zero as NH₃ starts to release. The accumulated release amounts of HCN and NH₃ first reach the maximum value at different pyrolysis time and then decrease sharply. The yield of char-nitrogen increases with increasing temperature. At 973~1 123 K, about 50~60 mass percentage of the coal-nitrogen exits in char as char-nitrogen and the rest is released as volatiles, in which about 20~50 mass percentage of the volatile-nitrogen is NH₃ and HCN. The mass percentage of NH₃ accounts for 40%~50% and that of HCN about 50%~60% in the volatile-nitrogen.

Key words: coal decoupling combustion pyrolysis NH₃ HCN

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