

论文

X12CrMoWVNbN10-1-1铁素体耐热钢奥氏体晶粒长大行为的研究

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摘要:

将超超临界发电机组高中压转子材料X12CrMoWVNbN10-1-1铁素体耐热钢试样在1010-1200℃之间经5-1200 min等温奥氏体化处理, 通过测量处理后的奥氏体晶粒尺寸对其奥氏体晶粒长大规律进行了研究. 结果表明: 当奥氏体化温度低于1050℃时, 晶粒长大表现为正常长大过程, 即使等温1200 min, 晶粒仍能保持均匀细小; 1050-1120℃之间等温奥氏体化处理, 奥氏体晶粒出现异常长大现象; 当奥氏体化温度高于1150℃时, 奥氏体晶粒以较大的速率正常长大. 拟合实验结果, 得出了不同温度下奥氏体晶粒长大的动力学方程, 并确定了获得不同尺寸奥氏体晶粒所对应的温度和时间参数.

关键词: 奥氏体晶粒 异常晶粒长大 晶界迁移激活能 铁素体耐热钢

BEHAVIOR OF AUSTENITE GRAIN GROWTH IN X12CrMoWVNbN10-1-1 FERRITE HEAT-RESISTANT STEEL

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Abstract:

The kinetic law of austenite grain growth in the X12CrMoWVNbN10-1-1 ferrite heat-resistant steel, which has been used as the high and medium pressure rotor of ultra-supercritical generating units, has been studied by quantitatively measurement of the austenite grain size after austenitized from 1010 °C to 1200 °C with holding time from 5 to 1200 min. The results show that the grain grows in a normal grain growth (NGG) mode when the austenitizing temperature is lower than 1050 °C, and the homogeneous small grains can be obtained even the holding time reaches 1200 min. When the austenitizing emperature lies between 1050 °C and 1120 °C with different holding tme, the bnormal grain growth (AGG) can be bserved. At even higher temperature than 1150 °C, the austenite grains grow rapidly with a NGG mode. The austenitizintemperature and holdng time are thus determined or different austeize grain states, and the parameters in te NGG knetic equation are fit.

Keywords: austenite grain abnormal grain growth boundary migration activation energy ferrite heat-resistant steel

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