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FGH95高温合金的静态再结晶机制

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摘要: 对热等静压FGH95合金高温挤压变形后的试样进行静态再结晶处理, 讨论了其再结晶形核机制及 γ' 相对再结晶过程的影响。结果表明: 合金在 γ' 相几乎完全溶解温度以上再结晶时, 形核以应变诱发晶界迁移机制进行, 而在 γ' 相大量存在的温度范围内则是以亚晶粗化形核机制进行; γ' 相的分解速率对再结晶速率有重要影响, 随再结晶温度的升高, γ' 相分解速率加快, 再结晶激活能减小, 再结晶速率加快, γ' 相分解后以同步或不同步方式重新析出。

关键字: FGH95高温合金; 静态再结晶; 形核机制

Static recrystallization mechanism of FGH95 superalloy

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Abstract: The as-HIPed FGH95 alloy was deformed by extrusion at high temperature, and then the as-extruded sample was treated with static recrystallization. The nucleation mechanism and the influence of γ' phase on recrystallization process during static recrystallization were also discussed. The results indicate that the nucleation mechanism is strain-induced boundary migration (SIBM) when alloy is treated near the temperature at which γ' phase can be dissolved completely, and it is sub-grain coalescence when alloy is treated at the temperature at which a lot of γ' phase exist. The γ' phase decomposition rate has an important influence on the recrystallization rate. With the recrystallization temperature increasing, the γ' phase decomposition rate increases and the activation energy of recrystallization decreases, resulting in recrystallization rate to increase. The γ' phase re-precipitates in recrystallized grains by synchronization or non-synchronization.

Key words: FGH95 superalloy; static recrystallization; nucleation mechanism

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