

C 和 N 含量对 V-N-Ti 微合金非调质钢组织的影响

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摘要: 研究了 C 含量 0.26wt%~0.42wt% 及 N 含量 0.0041wt%~0.021wt% 变化对低碳 V-N 微合金非调质钢锻态组织的影响。结果表明, C, N 含量对微合金非调质钢锻态组织中先共析铁素体的数量及分布存在显著影响。钢中的 N 含量一定, C 含量约为 0.33wt% 时, 组织中形成的晶内铁素体量最多, 组织最细小均匀; 钢中的 C 含量一定, 锻态组织中先共析铁素体的数量随着 N 含量的增加而增加, 但 N 含量对先共析铁素体数量的影响远小于 C 含量的影响。采用基于经典形核和长大理论模型计算所得析出动力学结果很好地解释了上述现象。

Effect of carbon and nitrogen content on microstructure of V-N-Ti microalloyed steel

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Abstract: The microstructure of V-N-Ti microalloyed steels with 0.29wt% ~ 0.42wt% C and 0.0041wt% ~ 0.021wt% N was studied by quantitative metallographic analysis. The results show that the carbon and nitrogen content has a strong impact on the distribution and amount of the proeutectoid ferrite in a medium carbon V-N-Ti microalloyed steel. So nitrogen does. When the nitrogen content keeps no change, more of intragranular ferrite (IGF) and more uniform and finer microstructure is available in the steel with 0.33wt% or 0.34wt% C. When the carbon is 0.33wt% or 0.34wt%, the amount of proeutectoid ferrite increases slightly with increasing nitrogen content. And the results also show that the influence of the nitrogen content on the amount of proeutectoid ferrite in the as-forged microstructure is smaller than that of the carbon content. Finally, the computer calculations of precipitation kinetics of vanadium based on the classic nucleation and the growth theory can well explain the experimental results.

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