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不同热处理态Ti-50.2Ni形状记忆合金的相变特性

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摘 要：用示差扫描量热仪研究了退火温度、退火时间和时效温度、时效时间对Ti-50.2Ni(摩尔分数)形状记忆合金丝相变特性的影响，给出了退火、时效工艺对该合金*R*、*M*相变温度和热滞的影响规律。结果表明：350~550℃退火态合金冷却/加热相变类型为*A*→*R*→*M*/*M*→*A*(*A*—母相，*R*—*R*相，*M*—马氏体)，600~800 ℃退火态为*A*→*M*/*M*→*A*，400 ℃长时间退火态相变类型为*A*→*R*→*M*/*M*→*R*→*A*；随时效时间延长，300 ℃时效态合金的相变类型经过*A*→*M*/*M*→*A*到*A*→*R*→*M*/*M*→*A*再到*A*→*R*→*M*/*M*→*R*→*A*的转变，400 ℃时效态相变类型经过*A*→*M*/*M*→*A*到*A*→*R*→*M*/*M*→*A*的转变，500 ℃时效态相变类型则保持*A*→*M*/*M*→*A*不变。

关键字： Ti-50.2Ni合金；形状记忆合金；相变温度；热滞

Transformation characteristics of Ti-50.2Ni shape memory alloy heat-treated in different processes

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Abstract: The effects of annealing temperature, annealing time, aging temperature, and aging time on the transformation characteristics of Ti-50.2Ni (atomic percentage) shape memory alloy wire were investigated by differential scanning calorimetry. The effect regularity of annealing and aging processes on the R, M transformation temperature and temperature hysteresis were given out. The results show that the cooling / heating transformation type of 350−550 ℃ annealed Ti-50.2Ni alloy is A→R→M/M→A (A is parent phase, R is R phase, M is martensite), that of 600−800 ℃ annealed alloy is A→M/M→A, and that of the alloy annealed at 400 ℃ for long time is A→R→M/M→R→A. With increasing aging time, the transformation type of 300 ℃ aged alloy changes from A→M/M→A then A→R→M/M→A to A→R→M/M→R→A,

the one of 400 ℃ aged alloy changes from A→M/M→A to A→R→M/M→A, and the one of 500 ℃ aged alloy keeps as A→M/M→A.

Key words: Ti-50.2Ni alloy; shape memory alloy; transformation temperature; temperature hysteresis

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