新东方背诵文选80篇：53镍钛合金Nitinol PDF转换可能丢失图片或格式，建议阅读原文

https://www.100test.com/kao_ti2020/207/2021_2022__E6_96_B0_E4_B8_9C_E6_96_B9_E8_c96_207314.htm 53 Nitinol Nitinol is one of the most extraordinary metals to be discovered this century: A simple alloy of nickel and titanium, nitinol has some perplexing properties. A metal with a memory, it can be made to remember any shape into which it is fashioned, returning to that shape whenever it is heated. For example, a piece of nitinol wire bent to form a circle that is then heated and quenched will remember this shape. It may then be bent or crumpled, but on reheating, will violently untwist, reforming its original shape. This remarkable ability is called Shape Memory Effect (SME). other alloys, such as brasses, are known to possess it to a limited extent. No one fully understands SME, and nitinol remains particularly perplexing, for, whenever it performs this peculiar feat, it appears to be breaking the laws of thermodynamics by springing back into shape with greater force than was used to deform it in the first place. But not only is nitinol capable of remembering, it also has the ability to "learn". If the heating-cooling-crumpling-reheating process is carried out sufficiently often, and the metal is always crumpled in exactly the same way, the nitinol will not only remember its original shape, but gradually it learns to remember its crumpled form as well, and will begin to return to the same crumpled shape every time it is cooled. Eventually, the metal will crumple and uncrumple, totally unaided, in response to changes in temperature and without any sign of metal

fatigue. Engineers have produced prototype engines that are driven by the force of nitinol springing from one shape to another as it alternately encounters hot and cold water. The energy from these remarkable engines is, however, not entirely free: heat energy is required to produce the temperature differences needed to run the engine. But the optimum temperatures at which the metal reacts can be controlled by altering the proportions of nickel to titanium. some alloys will even perform at room temperature. The necessary temperature range between the warm and the cold can be as little as twelve degrees centigrade. 镍钛合金镍钛诺是这个世纪所发现的最不寻常的金属之一，作为镍和钛的简单的一种合金，镍钛诺具有一些令人惊叹的特征。 这是一种有记忆力的金属，人们可以使它记住它被塑成的任何形状，并在加热后恢复这一形状。 比如，一节镍钛诺线圈在加热冷却后会记住圆圈这形状。 随后它可能被弯折成其它形状，但一旦再次加热，就会迅速地自动恢复成最初的圆圈状。 这种不寻常的能力被称为形状记忆效果(SME)。 其它一些合金如黄铜在一定程度上也具有这种特性。 目前人们对SME这一特性尚缺乏透彻的认识，而镍钛诺尤其使人惊奇，因为每当它展现这一惊人的功能时，似乎都违背了热力学原理。 因为它在恢复原有形状时所释放的力比人们使它变形所施加的力大得多。 镍钛诺不仅有记忆力，还能"学习"。 如果加热-冷却-弯曲-再加热这一过程重复一定次数，且每次冷却后它都被丝毫不差地弯成同一形状，它不仅可以记住最初的形状，还能逐渐记住它被弯成的形状，并开始在每次冷却时恢复这一形状。 最终，它会自动地随温度变化而弯曲和恢复这些形状，并且没有任何疲劳迹

象。 工程师们已制造出一些发动机样机，利用镍钛合金在交替遇热水和冷水时迅速改变形状所产生的力做推动力。 然而这些神奇的发动机工作时并非完全不耗能，因为必须有热能来制造温差才能使机器运转。 但人们可以通过改变合金中镍钛的比例来控制使它反应的最佳温度。 有的镍钛合金甚至能在室温下做出反应，冷暖之间的最小温差只有12°C。 